The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Science in Industry

IF it be true, as the Advisory Council for Scientific and Industrial Research state in the annual report for 1929-30, that they have nothing to record of a spectacular nature, it is none the less true that very valuable work has been done during the year, as the abstracts published in this issue, mainly relating to fuel research, chemistry, and metallurgy, show. A large proportion of the work undertaken is now done through the medium of the various research associations, the total grants to which amounted last year to £70,931. The expenditure by the Department during the year was £711,200, which was reduced by receipts (amounting to £174,454) to a net expenditure of £536,746. Of the original million fund £218,681 is still in hand.

The Department's chief anxiety concerns the financial stability of these associations, dependent as they are, apart from Government funds, on the voluntary subscriptions of industrial firms. Were it possible, the Council point out, to make a levy of an insignificant amount compulsory on all firms in an industry for the purpose of its research association, adequate funds would be immediately forthcoming which probably would actually relieve present subscribers of a portion of their present subscriptions, and in any case would place at the command of associations funds to deal more adequately with the pressing problems that beset them. A levy, it is suggested, could be arranged in various ways. In some cases the raw material used could be selected as the unit, as in the case of rubber and wool. In other instances the number of employees engaged, or some other suitable unit, could be adopted. Each industry needs to consider the circumstances of its case; but after many years' experience, the Council take the view that the time has arrived when this question needs the fullest consideration by all concerned. The value of the movement having been tested and proved, its development and stability must be ensured, and if statutory authority is necessary, a hope is expressed that Parliament will place industries in a position to provide the necessary funds on an equitable and national basis in those cases where a sufficiently large majority of the firms in any industry express their desire for the imposition of such a levy.

The financial stability of research associations, it is added, is of concern from many points of view. Not the least important aspect is the obvious effect which instability has upon the recruiting of staff and the retaining of men of proved scientific worth. When family responsibilities begin to assume serious proportions, financial uncertainty is a serious deterrent to efficient work. Provision for superannuation under the Federated Superannuation Scheme for Universities is a means whereby those responsible for the administration of research associations may help to alleviate such anxieties, since under its terms a man may, on a contributory basis, provide for the future irrespective of his continued employment at any particular institution. Only about half of the research associations have seen their way to become members under this scheme, and the Council hope that when salary figures are again reviewed by associations at present outside the scheme, the opportunity afforded by this method of improving the position of their scientific staffs may be seriously considered.

Attention has been drawn in previous reports to the importance of applying industrially the results achieved in the laboratory, and there is again a note on this important topic. "Many research associations," the Council state, "are for the moment actively seeking not so much to achieve further results, but to see to it that those already obtained are utilised by the industries they serve. It is of little use to obtain the means of improvement if those means are ignored at home and possibly utilised a little later by foreign competitors. A number of research associations have organised what are termed Development Sections, units devoted solely to the work of explaining to firms—often by personal visits and practical demonstration—the industrial value of the results of research and how they may be applied. We should be singularly unenlightened if we did not recognise the severe handicap under which firms are operating at the present time owing to industrial depression, and did not take into full account

the need to conserve financial resources; but, even with this handicap, there are many results which can be utilised without serious financial outlays for new plant. We commend highly the work of the Development Sections, and consider that adequate provision should be made by research associations for the maintenance and expansion of work of this kind."

National and Private Economy

WHILE the political world is breathing hot and cold on the subject of national economy, the business men's campaign in the country has been successfully launched. The great meeting which Viscount Grey, Sir Robert Horne, and Sir Ernest Benn addressed in the City of London a few weeks ago had a rapid sequel in the Chancellor of the Exchequer's repeated warnings on the critical position of the finances of the State. To emphasise those warnings and to ensure that there shall be no turning back, the business community of Manchester assembled in the famous Free Trade Hall on Tuesday for a demonstration which is to have its counterpart in other industrial centres outside the metropolis. The weight of authority behind the movement was again shown on the Free Trade Hall platform with Lord Colwyn in the chair and Sir John Simon and Sir Ernest Benn as the principal speakers The only difficulty at the moment is to secure in the public mind a proper distinction between national economy and private economy. Economy is always a sound rule of personal conduct, but the growing demand for a reduction of national expenditure would fail of its permanent effect if it were to be construed as a demand for less spending by the private consumer. The whole aim of the National Economy Movement is to liberate more money from the till of the tax collector for spending in the normal way of business with the British trader. Less public expenditure, in fact, means more private expenditure, and so a better trading position for everybody.

The Rust Problem

AT a luncheon in London this week, a simple and unpretentious account was given to a small party of experts of a new form of liquefied or colloidal lead, which, it is claimed, when applied to iron and steel, makes these metals permanently impervious to rust. The substance, to which the name "Nust" has been given, is being manufactured by the Non-Rust Liquid Lead Co., Ltd., London, at their Bristol factory, and the managing director of the company, Mr. J. C. Minors, explained shortly its manufacture and properties, and exhibited a few samples of its application to iron and steel. A Swiss scientist, it appears, some seven years ago, after long experiment in smelting lead with other metals, succeeded in producing it in a form equivalent to molten lead, and in preserving it in that state by the aid of oils as conveyors. From the description given, the lead appears to be reduced to an extremely fine powder or dust; mixed with oil this becomes a stiff paint that can be applied with a brush. The claim is that the lead penetrates the iron and steel, and becomes so completely amalgamated with it that it can only be separated by some metal separation process, while the oils merely dry off and disappear.

Mr. Minors told of a number of trials and tests, which went to show that rust could not penetrate between the metal and the lead covering. Another advantage claimed is that while ordinary paint will not stand the stretching of the steel or iron by more than ·05 per cent. without scaling or cracking, this substance has successfully stood a stretching test of 1 per cent. It was explained that the company are now in a position to produce "Nust" on a commercial scale. It is applied thinly exactly as an ordinary paint, and one lb., costing 1s. 9d., is capable of covering seven square yards of surface. If, of course, one coat permanently protects against rust, practically for all time, the cost of periodical renewal is saved, and that fact would greatly diminish the initial outlay. The case, as we have said, was stated in quite modest terms, and it may at least be fairly said that this colloidal lead, or lead in suspension, has a distinct interest for all interested in the protection of iron and steel from their most destructive enemy, rust. Possibly the preparation may have other applications, but it was frankly stated that the experiments so far had been limited to iron and steel.

The Calendar

Mar.		
9	Institute of Metals (Scottish Section): Annual General Meeting. Open Discussion. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
10	Institute of Metals (N.E Coast Section): "The Extraction of Copper." R. D. Burn. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
10	Society of Chemical Industry (Birmingham and Midland Section): "Rustproofing of Iron and Steel." E. C. F. King. 6.45 p.m.	Chamber of Commerce Buildings, New Street, Birmingham.
10	Institution of Petroleum Technologists. 5.30 p.m.	John Street, Adelphi, London.
11	Society of Dyers and Colourists (Midlands Section): "Removal of Stains from Hosiery Goods." H. L. Long. 7.30 p.m.	Leicester Technical College.
11	Institute of Chemistry (Bristol and S.W. Counties Section): Annual Meeting. 7.30 p.m.	University, Bristol.
11	Institute of Fuel: "The formation of Coke." John Roberts. 6 p.m.	Burlington House, Piccadilly, London.
11 & 12	Institute of Metals: Annual General Meeting. 10 a.m.	Institution of Mechanical Engineers, Storey's Gate, London.
11	Annual Dinner and Dance. 6.45 p.m. at Trocadero Restaurant, London.	
12	Institute of Metals (London Section): "Gases in Metals." C. J. Smithells. 7.30 p.m.	83, Pall Mall, London.
12	Society of Chemical Industry (Nottingham Section): "Chemistry in Beet Sugar Manufacture." J. Kwantes. 7.30 p.m.	University College, Nottingham.
12	Oil and Colour Chemists' Association: "Modern Tendencies in the Application of Decorative Materials." Bernard Cayley. 7.30 p.m.	30, Russell Square, London.
12	Optical Society. 7.30 p.m.	Imperial College of Science, South Kensington, London.
13	Oil and Colour Chemists' Association (Manchester Section): "Recent Lines of Advance in Lake and Pigment Chemistry." F. A. Mason. 7 p.m.	Milton Hall, Deansgate, Manchester.
13	West Cumberland Society of Chemists and Engineers: "Mine Explosions." Professor Poole. 7 p.m.	Workington.
13	Chemical Engineering Group: "The Manufacture of Lime." W. J. Rees. 8 p.m.	Burlington House, Piccadilly, London,
14	International Society of Leather Trades Chemists. Annual meeting. Papers by R. F. Innes, Dr. A. Colin Russ, Dr. D. Burton, H. G. Bennett, Dr. J. Gordon Parker. 10 a.m.	University, Leeds.

Trade Rivalry in South America

Notes on British Policy

MR. JOHN A. BENN, our Special Correspondent to South America, writing from Havana, February 17, says :—

In my dispatch from New York, published in THE CHEMICAL AGE of February 28, I referred to American apprehension regarding the British trade Exhibition in Argentina. My remarks have been confirmed by an article since published in the *Business Week*, which adopts a critical attitude towards the Prince of Wales's tour and its results. "Rival interests are making no counter moves that appear on the surface," the journal states. "Good taste and policy dictate that the British be allowed to stage their show without any boos or hisses from the back of the house. Yet widely separated events fall into patterns that cannot be the result of blind coincidence."

It is pointed out that the Italians have descended upon Rio de Janeiro with a whole convoy of seaplanes which made a spectacular flight across the ocean. There are many Italians, in Argentina particularly, who own retail shops. Could this have been an astute move on the part of the Duce to remind his fellow-countrymen that Mother Italy has wares for sale! Other foreign activities include the purchase by Soviet Russia of 1,100 tons of Argentine casein, while Germany talks of sending a "show boat" to tour the coasts of South America in order to display samples at the big cities.

The most significant event is the proposal of the U.S. Department of Commerce to establish an additional trade commissioner at Buenos Aires. The Government has already been asked to sanction a sum of $528,700—over £100,000—to promote commerce in Latin America this year. At present the United States enjoys the largest proportion of the foreign trade of these Republics, but special activity is required to check the serious decline experienced during 1930.

It is admitted that Britain has many factors in her favour. There are about 35,000 Englishmen living in Argentina, who hold strong positions in banks, railways, and public utility companies. Most of the railways are British owned or controlled, and having their boards and buying departments in many cases in London is an important trade asset. The Americans are also conscious of the irritation in Argentina against their tariff, which the *Business Week* says is being counted on to boost British popularity.

As against this last factor, the natural ties of commercial routes and republican ideals are relied on by the United States. "Like ours, the nations to the South are daring, somewhat contemptuous of law." From reading *La Nacion* and other Argentine journals, I doubt whether the republican ties count for so much as the Americans suppose. There is, however, a factor which deserves the closest study by British interests—the influence of American films. Most of the films now shown in Argentina come from Hollywood, and their effect in relation to trade is too obvious to require emphasis. Audiences see nothing but American cars and other products, and the films afford most valuable propaganda from the commercial standpoint.

I understand that many British firms are planning to show films at Buenos Aires next month, illustrating processes of manufacture. It is to be hoped that domestic films will also be shown, and that our producers will take this unique opportunity to establish a hold on the South American public. Cultural factors are of the utmost importance in relation to the future. In order to obtain big results from these markets we must foster the interest in British life and institutions, which already have a considerable following. The sports prevalent there have been introduced mainly from England, with the result that our sports goods enjoy a natural preference.

No doubt the same consideration applies to other aspects of life in Latin America. I am therefore planning that the new journal, *Industria Britanica*, to be published shortly by the proprietors of THE CHEMICAL AGE, shall have a domestic appeal to its readers, as an important part of its mission for developing British trade in these markets.

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indicando THE CHEMICAL AGE

Dr. Charles L. Parsons

Business Manager of American Chemical Society

DR. CHARLES L. PARSONS, of Washington, has been appointed business manager of the American Chemical Society. Dr. Parsons is the first occupant of this post, created by the Board of Directors as a development of the Society's reorganisation policy. Recently the number of directors was increased from ten to fourteen, Dr. Charles L. Reese, of E.I. du Pont de Nemours and Co., Wilmington, Del., having been made chairman of the Board.

Dr. Parsons has been secretary of the Society since 1907. He was born in New Marlboro, Mass., in 1867, and graduated from Cornell in 1888 as a bachelor of science. He received the degree of doctor of science from the University of Maine in 1911 and the degree of Doctor of Chemistry from the University of Pittsburgh in 1914. He was professor of chemistry in New Hampshire College from 1890 to 1911, and thereafter until 1919 was chief chemist of the U.S. Bureau of Mines. Dr. Parsons was awarded the William H. Nichols Medal of the New York Section of the Society in 1904 for research on the atomic weight of beryllium.

Dr. Parsons is a member of the Nitrate Commission and of the Advisory Board on Gas Warfare. He was vice-president for America of the International Union of Pure and Applied Chemistry in 1919–22. He is an officer of the French Legion of Honour and of the Crown of Italy. He is an author of note, and has been a frequent contributor to scientific journals and Government publications.

As business manager of the American Chemical Society, which he has been largely instrumental in building up, Dr. Parsons will administer the centralised business affairs of the largest professional organisation of its kind in the world. The membership of the Society is now approximately 18,000, and its budget for 1931 amounts to about $600,000.

National Mark for British Steel

THE adoption of a National Mark for British Steel was announced at a luncheon of the British Steelwork Association in London on Monday. Sir William Larke, director of the National Federation of Iron and Steel Manufacturers, who was the principal guest, said the scheme was designed to ensure that the lay purchaser may be able, at a glance, to distinguish between British and foreign steel. Continental manufacturers had for years rolled sections of British standard specifications in order that they might compete in markets requiring British standards of quality. Those sections or plates had been banded or marked "B.S," which purchasers had taken to mean "British steel," whereas it meant only "British Standards."

The difference between British and Continental steel was one definitely of quality. Our steel was of greater strength, because it was made under a process by which the quality of the steel could be tested, while it was being manufactured. Continental steel was made by a process under which the quality could be judged only by the eye—a process that had been abandoned in this country since 1910.

Scientific Research Applied to Industry

What the D.S.I.R. and Associations are Doing

The report for the year 1929–30 of the Department of Scientific and Industrial Research (H.M. Stationery Office, 3s. 6d.) reviews at length the work done and still in progress under the control of the Department and the activities of the numerous research associations attached to various trades. The abstracts given below relate to chemical and metallurgical investigations.

Discussing the present economic situation and the volume of unemployment, the report at once acknowledges that science can by itself offer no solution, but adds that no complete solution is possible that ignores the help that science can give. Dealing with the pressing question of intense world competition, the report proceeds :—

"This competition is one of price and of quality. A customer naturally wishes to have the best article at the lowest possible price. Manufacturers are striving to maintain or improve the quality of their goods and at the same time bring their prices into relationship with those charged by foreign competitors. The full application of scientific knowledge and scientific method to existing processes of manufacture, and the active prosecution of research to discover new processes, are, we believe, essential if remunerative production is to be realised. At the end of the last century, and even later, Great Britain held a pre-eminent position amongst the industrial nations of the world. This position has been partially lost, and while many factors have operated in that misfortune, we have no doubt that amongst them has been the increased use of scientific knowledge and scientific method by our competitors abroad to overcome disabilities arising either from natural disadvantages or from the advantage which Great Britain held by its earlier start as an industrial nation. For example, one of the great advantages enjoyed by us in the last century was the possession of vast resources of power in the form of coal. Though we still possess these resources, their competitive value has been largely lost by the development abroad of alternative sources, *e.g.*, water power and oil, as well as by the working in other countries of coal supplies as rich as our own. We cannot expect to recover the position we once held unless, where we possess natural advantages, we exploit them to the full, and where we have no advantage we employ all the agencies available for increasing our efficiency."

Fuel Research

Considerable attention is as usual given to problems of fuel research. The contemplated investigations on the production of metallurgical coke include the erection at East Greenwich of experimental coke ovens at an estimated cost of about £50,000.

"Coal (the Advisory Council state) is carbonised in coke-ovens for the production of the hard, dense and strong material which is essential for metallurgical purposes. Coals considered suitable for coking are at present defined within narrow limits by specification, and this in itself imposes restriction on the available supplies. There is, under present conditions, reason to anticipate a shortage of coking slacks, within a measurable space of time, unless by investigation it can be shown that coals other than those at present employed are suitable for coking. When it is realised that the cost of coke constitutes about 30–40 per cent. of the cost of producing iron and steel, the importance to these industries of investigations designed to extend the range of supply will be appreciated. The iron and steel industry is not the only one to which the projected researches may be expected to yield results of value. The coal industry may be provided with new outlets for coals at present considered unsuitable for coking. The gas industry may derive advantage, as there is a tendency on the part of gas companies to try some form of coke-oven in place of the usual gas-retorts. The magnitude of the economic issues involved may be illustrated by the fact that at present about 17,000,000 tons of coal are carbonised annually in coke-ovens, or about the total quantity used by the gas industry in a year. We naturally asked why large-scale experiments are required to establish the facts, and why laboratory investigations could not furnish the necessary information at a relatively small cost. The coking of coal is governed by several factors ; the period during which the coal is subjected to furnace treatment, the range of temperature employed and the rate at which that temperature changes. Temperature conditions naturally vary throughout the oven, and it would be impossible to reproduce factory conditions on a small scale. Consequently full-scale experiments are essential if results on which reliance can be placed are to be obtained ; conclusions reached on the basis of small scale experiments may prove fallacious."

Low Temperature Carbonisation

"In spite of many failures there are now in existence a few systems which have been developed to a commercial scale. Several large plants are at work, or about to start operations. It is generally agreed that further work is principally required on the properties of the tar obtained in low temperature distillation, especially in the direction of obtaining, by cracking or by hydrogenation, a conversion of a large percentage of its bulk into motor spirit. The conversion of tar into motor spirit has been actively investigated for some years at the Fuel Research Station. Briefly, it has been shown that it is possible to convert some 70 per cent. of the tar by volume into motor spirit, together with some 20 per cent. of neutral oil which could again be treated so as to obtain further motor spirit. The method employed involves the treatment of the tar, in the presence of catalysts, with hydrogen at high temperatures and pressures. The possibilities of obtaining similar results at lower pressures are being studied. Investigation of the tar, with the object of using it as a raw material for the manufacture of chemicals, preservatives, drugs, etc., has also been carried out at the Chemical Research Laboratory of the Department.

"In any carbonisation process heat is lost, and the process only becomes possible financially if one or more of the products have sufficient commodity value conferred on them to compensate for this loss, and to pay for the whole cost of carrying out the process. In high temperature carbonisation processes, 'main' products are obtained which have high commodity values for certain purposes, *i.e.*, metallurgical coke in the coke-oven industry and gas in the gas industry. The economic success of these industries depends on the fact that these two products command special prices, which can be adjusted, within limits, so that with the returns from 'by-products,' the process can be made to pay. Low temperature carbonisation, on the other hand, has a direct competitor for all its products, for instance, solid smokeless fuel competes with raw coal, the tar and its products with the products of gas tar and natural oils, and the gas can only be sold, if at all, at a price (under similar conditions of demand) somewhat less than the cost of making a suitable gas by the cheapest alternative process."

Referring to the Gas Light and Coke Co.'s experimental work, it is stated that the plant has proved more expensive to work than had been anticipated, due mainly to the fact that the metal used for the retorts deteriorated rapidly in such a way as to increase the labour costs beyond reasonable limits. Four different types of retorts, involving differences in metal and design, were embodied in the Richmond plant, but all have suffered distortion. This has long been a major technical difficulty in the use of certain types of externally heated retorts, but there is good reason to believe that, largely as a result of the attention which has been given to the problem by the British Cast Iron Research Association, it is being rapidly overcome. Since the placing of the contracts for the Richmond plant, further designs have been tried at the Fuel Sesearch Station, and one of these, based on further advice given by the Research Association, has stood for two years without distortion. The future of the Richmond plant is now under consideration.

Hydrogenation

By treating coal with hydrogen at temperatures of 400–500° C., and at pressures of some 200 atmospheres, it is possible to convert a large proportion of the coal substance into liquid fuels. It would obviously be of great advantage to the country if this process could be developed so as to produce liquid fuels, and especially motor spirit, from home sources.

Experiments have been continued at the Fuel Research Station, to study the reactions that take place, using both small bombs and a continuously working plant with a nominal capacity of one ton of coal a day. The action of catalysts has been studied, using coal (containing the minimum of ash) which has been specially cleaned for the purpose. The latest results show that it should be possible to obtain a *minimum* of 120 gallons of light spirit per ton of coal (*i.e.*, about 40 per cent. by weight of the coal treated), together with some heavier oils. There are very few firms that have the knowledge and experience necessary for working a process of this kind, and as Imperial Chemical Industries, Ltd., have been working to develop the process on a commercial scale, this aspect of the question has not been dealt with by the Department.

Pulverised Fuel

The study of the problems involved in burning coal in the pulverised form is one of those to which increasing attention is now being given at the Fuel Research Station. The Babcock and Wilcox boiler and the Lancashire boiler at the station have now been adapted for the use of pulverised fuel, the former having been raised 9 ft. to provide the large combustion space commonly used in commercial practice on land. The necessary drying and pulverising plant has been provided. It is intended to use this plant, in the first instance, to obtain experience of present practice and then to use it for such further experiments as seem desirable. The physics of the subject have been studied, and three different types of experimental burners and furnaces have been constructed with a view to obtaining quantitative data on the factors which govern the burning of solid particles in combustion chambers of the minimum volume compatible with commercial conditions.

In the section dealing with water pollution research it is stated that a definite stage has been reached in the investigations on the purification of beet sugar effluents by biological filtration, and arrangements have been made for a study of the colloidal properties of beet sugar effluents and of sewage under the direction of Professor Donnan. Another investigation begun during the year is concerned with the difficulties experienced by water supply undertakings owing to the corrosive action on iron mains and the plumbo-solvency of certain waters.

Behaviour of Materials at High Temperatures

The work carried out at the National Physical Laboratory on the recommendation of the Committee on the Behaviour of Materials at High Temperatures has been continued during the past year.

At the request of the Air Ministry, a nickel-chrome-tungsten steel and a 16 per cent. tungsten steel have been tested. Work on the influence of various treatments upon the creep properties of similar steels has been completed, and the reports concerned are being prepared for publication. The investigations into the nature and mechanism of creep have been continued and a number of improvements and refinements introduced into the three creep units specially constructed for this work. Significant results have already been obtained in the case of ingot iron, and the work is being extended by the inclusion of mild steels, nickel-chromium alloys, etc. Some further tests have been carried out in connection with the exploratory work on the alloys of nickel and chromium and their derivatives.

On behalf of Synthetic Ammonia and Nitrates, Ltd., a number of materials have been tested under special repayment terms. Upon the committee's recommendation, comparative tests are being made upon the 0·24 per cent. carbon steel and the high tensile 0·23 per cent. carbon steel previously tested for David Colville and Sons, Ltd. It is recommended that, as soon as these additional tests have been completed, the results of the whole investigation should be published.

A considerable amount of work has been undertaken in co-operation with industry. Research is being conducted in the laboratories of the British Non-Ferrous Metals Research Association to discover new types of non-ferrous alloys suitable for service at high temperatures, but progress has been somewhat delayed owing to changes in the association's investigation staff. A parallel scheme for discovering new types of ferrous alloys for service at high temperatures has been put in hand. Three carbon steels are in course of test, and it is intended that the results should serve as a basis upon which to judge the effects of added elements. A survey of information on creep and scale-resisting properties of steels has been prepared. Considerable importance is attached to the question of "scaling," which is a result of reactions with furnace gases and high pressure superheated steam, and special apparatus is being constructed with a view to comparing the behaviour of steels under such conditions.

Light Alloys

Research has continued on aluminium and its alloys, and has been recommenced on magnesium and its alloys.

The removal of gas from aluminium alloys is one of the more important subjects at present being studied. It has been shown by other workers that chlorine gas helps to remove dissolved gas from molten metal, and as a consequence several chlorides and tetrachlorides have been tried. Many volatile chlorides possess the same property of removing gas without grain refinement, but only titanium and tin tetrachloride gave in addition a marked grain refinement (with aluminium, silicon and Y-alloy). Carbon tetrachloride, silicon tetrachloride, tin tetrachloride, aluminium chloride, ferric chloride and tetrachlor-ethane were also effective in removing gas from molten silicon-aluminium alloys.

The corrosion of wrought light alloys has been studied at the Royal Aircraft Establishment, where the factors governing the occurrence of intercrystalline corrosion have been sought where these alloys are stressed in tension to varying degrees of elongation. Duralumin from old stock was found to be more susceptible to this type of corrosion than that from new stock. Various methods of protecting aluminium alloys have been tried, including certain types of coating in the nature of varnishes as used in America. On the whole, no method yet tried has given as good a protection as anodic oxidation followed by an application of lanoline.

Further work has been carried out on the permanence of dimensions of light alloys subjected to heat treatment and subsequent machining. The alloys were duralumin, Y-alloy and two copper silicon alloys. Heat treatment caused distortion of all the test pieces, but no secular changes were detected, and low temperature soaking lessened to a slight extent the dimensional changes which occurred on machining.

Some alloys of alluminium with thorium and silicon have been tried with a view to discovering new alloys capable of improvement by age hardening or modification. The results did not show great promise, and in view of the fact that thorium is both heavy and expensive, the investigation has not been pushed further than the binary alloys containing up to 12 per cent. of thorium and two ternary series containing 5 and 10 per cent. of thorium with varying quantities of silicon.

Some attempts have been made to protect magnesium alloys against corrosion. Samples of a magnesium casting alloy, previously subjected to treatment in an aqueous solution of potassium dichromate, potassium aluminium sulphate and sodium hydroxide at a temperature of 90° C., and subsequently treated with lanoline, were exposed frequently to heavy sea water spray. One sample was corroded severely in less than two months, but the rest of the samples exposed to less exacting conditions showed no appreciable corrosion after 14–16 months.

Chemical Research

The work undertaken at the Government Chemical Research Laboratory, Teddington, under the direction of Professor G. T. Morgan, is described under the following heads :—

Corrosion Research.—The oxygen absorption method previously employed in a quantitative study of the corrosion of pure zinc immersed in aqueous solutions of potassium chloride or sulphate has now been extended to the case of iron and steel. The formation of oxidation products of copper has been studied in artificial atmospheres of definite humidity containing known amounts of sulphur dioxide, and the results have been compared with those obtained with copper specimens freely exposed to the open air of Teddington. Work on the corrosion of magnesium and its alloys and on the protective measures applicable to these metals is in progress and a report is in preparation.

High-pressure Research.—Experiments with carbon monoxide and hydrogen have been continued, and a wide search has been made among catalysts obtainable from metallic

salts and oxides with the object of finding catalytic materials which will induce the formation of organic products other than methyl alcohol and methane. Formaldehyde and propionic acid have been identified and characterised in high-pressure condensations with the gas mixture—1 CO to 2 H_2—over manganese-copper-cobalt and zinc-manganese-cobalt catalysts respectively. Further experiments have been made on catalysts which produce ethyl alcohol, and it has been noticed that in such contact masses iron may replace cobalt.

Many attempts have been made to induce the interaction of carbon monoxide with ethylene under pressure and in presence of various catalysts. These results have been generally negative, although some indication of interaction was observed in the presence of aluminium chloride. Experiments have been made on the condensation of ethylene with phosgene, but in this case also the products were ill-defined and mixed with materials formed by the concurrent polymerisation of ethylene.

Helium from Monazite Sand.—The process for obtaining helium by heating monazite sand in an atmosphere of carbon dioxide has been brought to a successful conclusion. The sand lent by Thorium, Limited, has all been put through the furnace, and the resulting helium has been purified and stored under pressure. The helium content of the gas is 99·6 per cent. This investigation has now been completed and the results have been published.

Research on Tar

Low-Temperature Tar.—The chemical study of a representative low-temperature tar has progressed, and from a mixture of solid aromatic hydrocarbons, mono-, di-and tri-methy derivatives of anthracene have been isolated and compared with authentic synthetic specimens. In the phenolic fraction, phenol, the three cresols and five of the xylenols have been identified, whilst from the neutral oils, waxes fusing as high as 67° have been isolated, and highly unsaturated oils havel been extracted by means of mercuric acetate. Resinous constituents have been analysed and degraded to yield a series of benzene-carboxylic acids. One series of low-temperature tars derived from coals of varying coking power, and carbonised by the same method, and another series from one coal carbonised by different methods, have been examined by the solvent method. In addition, tars from commercially established processes of low-temperature carbonisation have been investigated.

The four types of resinous products present in low-temperature tar have also been shown to be constituents of a whole range of tars and pitches including wood, peat, lignite, bituminous and Bergius tars. Further examination of the phenols present in aqueous liquors from low-temperature carbonisation has led to the identification of quinol and resorcinol, in addition to two methylated derivatives of catechol, and a series of liquors has been examined for the phenol and catechol content. "Bakelite" and "novolak" resins have been successfully prepared from phenolic fractions of low temperature tar and it has been shown that condensation products can be obtained from crude tar distillates without the intermediate step of extraction of phenols by caustic soda.

Experiments on the cracking and hydrogenation of tar and tar fractions are in progress, and organic syntheses have also been carried out employing carbon dioxide and neutral, basic and acidic hydrocarbons in presence of catalysts. In this direction interesting results have been obtained, Michler's ketone, tetramethyl base and dimethyl-*p*- aminobenzoic acid being formed by the action of carbon dioxide on dimethyl-aniline, whilst diphenylurea and monoethyl-diphenylurea were produced by the action of the same gas on aniline and ethylaniline respectively.

Chemotherapy.—Many chemical compounds have been prepared and submitted to the Committee on Chemotherapy, but so far results have been negative, except in the case of a few organic antimonials, which have exhibited slight trypanocidal activity. Among the organic compounds which have given only negative results are derivatives of the Bayer 205 type containing carbazole, fluorene and fluorenone nuclei.

Synthetic Resins.—Research has been undertaken on formaldehyde condensations with acetone and its homologues in alkaline media. The results show that, as the homologous series is ascended, larger quantities of alkali and more prolonged heating are required in order to produce resins. Intermediate stages in these condensations have been identified in the case of acetone and also with methyl ethyl ketone. Meanwhile the researches on formaldehyde-phenolic resins have been pursued, special attention being paid to formaldehyde-*m*-cresol resins likely to have high electrical insulating properties. Detailed examination of the acidic condensations of formaldehyde with various phenols has resulted in the isolation of crystalline intermediates, several of which are new.

Water Pollution.—The solubility of base exchange materials has been examined under warm conditions, and it was found that, at normal rate of flow, contamination of softened water with silica is negligible. Base exchange materials of synthetic origin are more soluble than those produced from minerals. The greater the original silica content of the water, the less is the solubility of the base exchange material.

General Research.—Researches on organic derivatives of selenium and tellurium have been continued, and the investigation of heterocyclic systems containing selenium is now nearing completion. The four-, five- and six-membered rings have been examined in detail, and the physical and chemical properties of these cyclic systems have been recorded. The six-fold polymeride which accompanies the four-membered ring has been examined in detail.

Pyrolysis of diazoamino compounds has been further studied, and the research on diazoamino-*p*-toluene has now been concluded. The volatile products of the pyrolysis of this compound are chiefly nitrogen and toluene, with a small amount of ammonia. The less volatile products of pyrolysis, obtained by distillation under diminished pressure, are azo-*p*-toluene, *p*-p^1-ditolylamine, 6-amino-3:4^1-dimethylazobenzene and two isomeric aminoditolyls. The more plentiful of the two aminoditolyls has been proved to be 2-amino-4^1 : 5-dimethyldiphenyl (4^1 : 5-dimethyl-2-xenylamine) by its pyrogenic conversion into 2 : 6-dimethylcarbazole.

The two chemists in training from the South Metropolitan Gas Company have continued their collaboration in research during the past session.

Pulverised Fuel Firing

Progress of the "Unit" System

ONE of the most notable features in fuel technology during 1930 was the advance of the unit pulveriser, especially for steam generation, and this general principle possesses obvious attractions for many varieties of furnace setting operation in the chemical and allied industries. The recent contract for the first section (150,000 k.w.) of the "Dunston B" Station at Newcastle, which includes 6 "Clarke-Chapman" boilers of 156,000 lb. normal evaporation and 625 lb. pressure and 825° F. superheated steam temperature, with 4 boilers out of the total of 12 operated by "Resolutor" unit pulverisers, is significant in this connection. Extensive practical experience, both on land and sea, has now been obtained with this design of pulveriser, and at the Luton Corporation Station there are operating two "Woodeson" boilers, each of 45,000 lb. evaporation per hour with one "Resolutor" pulveriser, and of 2½ tons of coal per hour capacity. Also there has been installed at Luton two large "Clarke-Chapman" boilers, each of 120,000 lb. per hour evaporation with two pulverisers of 5 tons of coal per hour, the same size that is to be installed at the "Dunston B" station. Further, an important equipment of these pulverisers has been fitted at the Stepney Borough Council Station, London, on three "Spearing" boilers, each of 100,000 lb. evaporation per hour, operated by three pulverisers.

A number of important industrial plants, with water tube boilers, are running at Baldwins, Ltd. (Swansea), Pelaw Main Collieries; Cleveland Products, Ltd., Houghton Main Colliery; Horden Colliery; Charlow Sacriston Collieries and Londonderry Collieries; David Colville and Sons, Ltd.; Pease and Partners, Ltd.; Ebbw Vale Steel and Iron Co., Ltd.; and Parkgate Iron and Steel Co., Ltd.

The most important possibilities are also obviously represented by an installation of these pulverisers on eight "Lancashire" boilers at the Holmside and South Moor Coal Co.'s Craghead Colliery, and by various "Scotch" marine boiler plants. A number of metallurgical furnaces have been equipped for drop stamping and general metal heating, while a large scale water tube boiler plant at the firm's works, Gateshead-on-Tyne, has burnt under commercial conditions almost every description of solid fuel.

Colours for the Rubber Industry

Manufacturers' Problems

THE Manchester Section of the Oil and Colour Chemists' Association and the Manchester and District Section of the Institution of the Rubber Industry held a joint meeting on Friday, February 27 at Manchester. Mr. G. A. Campbell, Chairman of the Manchester Section of the Oil and Colour Chemists' Association, presided. There were also present Mr. W. C. Smith, Chairman of the Manchester and District Section of the Institution of the Rubber Industry, and Mr. Noël Heaton, President of the Oil and Colour Chemists' Association.

Rubber Manufacturers' Colour Problems

A paper on "Colours Used in the Rubber Industry" was read by Mr. E. N. Bratby, A.I.R.I. (Sc.) in the unavoidable absence abroad of Mr. G. F. Thompson, A.I.R.I. (Sc.), who had prepared the paper jointly with him.

It was mentioned in the paper that the rubber industry, probably more than any other, made very heavy demands on the pigments it used. The question of vulcanising alone involved several different processes—press cure, open steam cure, cold cure, dry heat cure—each of which was different in its action. Thus it was not surprising that a manufacturer specialising in one particular class of goods, for example proofing, made good use of colours which other manufacturers considered quite unsatisfactory. It was a distinct advantage to be able to use a colour in any type of mixing and cured by any method, a standardisation which was, however, often denied the compounder.

Before the extensive use of organic accelerators the long steam cure often employed was fatal to many organic colours, and indeed some mineral colours. Low temperature curing, however, had widened the field of bright organic colours available, although blues and greens seemed very sensitive to the action of wet steam. It was not surprising that early attempts to obtain brightly coloured ebonites were a failure, but such progress had been made in the manufacture of colours that with careful compounding attractive ebonites might now be produced.

Stability of Colours

Colours for rubber should be stable to dilute acid or alkali. In cold-cured rubber this was essential both for the curing and subsequent sweetening process. Colours which were unstable to alkali were unsuitable for sponge manufacture and would cause considerable trouble if used in rubber flooring, because of the strong caustic used for mopping. Stability to perspiration was another factor, the importance of which, in warm climates at least, had recently been stressed in connection with colours for proofing. Incompatibility with other rubber ingredients was often a source of trouble to the compounder. Golden antimony sulphide was particularly susceptible to acidity or alkalinity, and indeed without considerable cure it readily bleached or blackened.

Some colours had a retarding effect on accelerators, some were themselves mild accelerators, and others appeared to activate accelerators. Using a standard accelerated base, it frequently happened that variations in physical conditions and the rate of cure occurred if different colours were employed. Ultramarine often retarded, iron oxide accelerated, and golden antimony might induce scorching.

Light Fastness

The question of light fastness was one with which the colourist was familiar, but its importance to the rubber manufacturer could not be over-stressed. Some mineral colours appeared to exhibit slight colour changes, for example, crimson antimony, cadmium sulphide recovered a certain amount of brilliance, possibly lost during cure, and ultramarine frequently darkened in sunlight. Organic colours, however, unless carefully chosen from reliable manufacturers, invariably darkened—*e.g.*, violets, greens, and blues possibly more than other shades. As to the method of testing light fastness there was no doubt that natural daylight exposure was preferable to that of any artificial test. Unfortunately, in the English climate this was often impracticable, and decidedly variable in its results. With regard to the comparative merits of the usual artificial sources of light, the Mercury Vapour Lamp and the Fadeometer form of carbon arc, there was a division of opinion, both types having their adherents. It was certain that an artificial light ageing test did not inevitably agree with a natural light test, an example which had recently come to the notice of the writers of the paper being a violet containing a blue and a red both separately fairly light-resistant. The violet similarly, was resistant to artificial light, but on exposure for a short time on the laboratory roof there was an appreciable darkening due apparently to interaction of the colours. In this connection, a phenomenon, which was not confined to true colours, consisted of a colour change during light exposure followed by a subsequent recovery. Notable examples of this were prussian blue and lithopone.

Impurities

Probably the impurity most feared in rubber was copper, the occurrence of which in proofings, some years ago, was perhaps more often due to the fabric rather than to the colour employed, although poorer grades of ingredients such as blacks, zinc oxide, and litharge had been known to contain copper. Of recent years the demand for ornamental rubbers had resulted in the appearance of bronze powders as proposed colours for rubber. Other harmful impurities which should be avoided were manganese, soluble iron, and chromium salts.

Migration of colour, whether to the surface as a "bloom" or to adjacent rubber during or after cure, was another source of trouble. This could be readily tried out by curing a small disc of the coloured rubber on to a sheet of the untreated base. Any migration of colour to the white base could be readily observed, and subsequent blooming to the surface could be detected after a few days. As indicated by Naunton, the blooming of such rubber soluble colours could often be prevented by the addition of fatty acid, but if colours of this type must be used, it was advisable to employ a minimum of colour—*i.e.*, the concentration of the colour should not exceed its solubility in rubber.

In the past the lack of fineness in colours had been the cause of considerable trouble to rubber manufacturers, although complaints under this head were rare at the present day. Uneven dispersion, impurity of tone, pimpling, etc., were readily caused through colours being gritty. As with reinforcing ingredients, fineness of particle size was a desirable feature, but there was a limit which was dependent on any individual pigment. The apparent colour of a pigment became paler with a reduction in particle size, but the covering power was considerably increased in mixed rubber.

New Electric Steam Generator

MESSRS. HOWARD BIDWELL and Linus H. Jones, of the Massachusetts Agricultural Experiment Station, report to the American Chemical Society on a new type of electric generator which is applicable for use with hospital sterilisers, pressure-cooking retorts, or in any industrial process where a large quantity of steam is necessary for a short period of time.

"There are many processes," the report states, "in the scientific and industrial fields that require large amounts of steam for periods of short duration. High-pressure steam is expensive. There is also a labour cost if the law of the State demands a licensed operator. For sterilising purposes and other processes where steam and heat are required the use of the new electric steam generator is a forward step in economy. It is not now necessary to maintain the yearly expense of providing steam in high-pressure mains. This electric high-pressure steam boiler will give all that can be desired from a high-pressure main, not only in the service performed, but also in manipulation and constancy of temperature and with a fraction of the cost in producing heat."

Conference of Leather Trades Chemists

THE March meeting of the British Section of the International Society of Leather Trades Chemists will be held on Saturday, March 14, in the Leather Industries Department, The University, Leeds, at 10 a.m. In addition to the election of officers and other business, papers will be read on "The determination of water in vegetable tanned leather," by Mr. R. F. Innes, F.I.C.; "A new and improved method of moisture determination and its application to Leather," by Dr. A. Colin Russ; "A note on the determintaion of moisture in Leather," by Dr. D. Burton; "Mineral acid in leather"; discussion to be opened by Mr. H. G. Bennett, M.Sc., F.I.C.; and "Demonstration of a new form of tintometer," by Dr. J. Gordon Parker.

Nitrogen Supplies in Nature

A United States Survey

NITROGEN, which enters into the composition of so many useful products, constitutes four-fifths by volume of the earth's atmosphere, according to a report by Bertrand L. Johnson, of the United States Bureau of Mines. Estimates made by various authorities as to the total amount of nitrogen in the air go far toward dispelling any possible fear of a shortage of this element. One scientist states that the earth's atmosphere contains 4,000,000,000,000,000 tons of nitrogen, while another declares that the air over each square mile of the earth's surface carries 20,000,000 tons of nitrogen, a quantity sufficient to last the world for about 10 years at the present rate of consumption. When the superficial area of the globe 196,950,000 square miles, is considered, the magnitude of this enormous supply can be appreciated.

As nitrogen is slightly soluble in water, it is found dissolved in sea water, river water, rain water and mineral waters. It also occurs in gases of volcanic origin, in gases from springs and geysers, in gases from inclusions in certain rocks, and in the occluded gases of meteoric iron. It is reported in small quantities in a variety of rocks and minerals. All living matter contains combined nitrogen, which is a necessary constituent for the growth of living organisms. Fossil organic matter, preserved in beds of coal and oil shale, is likewise nitrogenous. Ammonia and ammonium compounds occur in the soil as a result of the bacterial decomposition of nitrogenous vegetable and animal matter. Ammonia is also present in the air, and some volcanic waters contain ammonium compounds.

Electrical discharges in the atmosphere cause the formation of oxides of nitrogen. These oxides dissolve in rain to form nitrous and nitric acids which are carried down to the earth's surface and washed into the soil. It has been estimated that lightning results in the fixation of 100,000,000 tons of atmospheric nitrogen annually.

Natural and Synthetic Products

Before 1914, Chile, because of her extensive resources of natural nitrates, practically monopolised the world markets for one of the leading fertiliser materials. Since nitrogen also is an important war material, constituting the principal ingredient in many high-powered explosives, the war and the widespread insistence upon national self-sufficiency for war materials brought about the development of nitrogen fixation plants in all of the larger countries. The production of by-product ammonia from gas and coke plants was likewise stimulated. As a result, Chile, even after the ocean lanes were reopened, was forced to fight for her lost markets. Since the world capacity to produce is still far in excess of annual consumption, the competition between natural and synthetic supplies has been keen, and prices have fallen below pre-war levels.

Chile has recently succeeded in unifying her industry, utilising the most efficient process now in operation, and the Government is a partner in the new company that will take over all of the present producing companies. These developments place Chilean nitrate of soda in a much more favourable position among the markets of the world. More intense competition will undoubtedly follow.

The outstanding features in the world situation are the rapidly increasing world production of nitrogen, due partly to the desire of the larger nations to become self-sufficient in nitrogen; a less rapid increase in the consumption of nitrogen; and consequently, over-supplied world markets and declining prices for nitrogen.

Fixed nitrogen now dominates the nitrogen industry. In the year ended May 31, 1929, only 23 per cent. of the world's inorganic nitrogen consumption was furnished by natural sodium nitrate and only 20 per cent. by by-product sources, while atmospheric nitrogen fixation processes supplied the balance of a little over 56 per cent., or 1,200,000 metric tons. The period following the war favoured the development of the direct synthetic ammonia process; and, of the nitrogen now produced by the fixation of atmospheric nitrogen (56 per cent. of the total), nearly three-fourths is fixed by the direct synthetic ammonia process, while less than one-fourth is fixed by the cyanamide process, and less than 5 per cent. by the arc process.

In 1928, the five largest nitrogen-producing countries—Germany, Chile, United States, Great Britain and France—accounted for about 86 per cent. of the world production of nitrogen. Germany is by far the largest producer; the larger part of her nitrogen comes from synthetic processes, although her by-product nitrogen production exceeds that of all other countries except the United States. Chile, because of her sodium nitrate industry, ranks second. The United States and Great Britain are third and fourth respectively, largely because of their by-product coke industries. The world consumption of nitrogen is increasing. The annual increase in recent years has been irregular, but has had a general upward trend and has ranged from 90,000 to 360,000 tons.

Most of the nitrogen produced in the United States has been derived from by-product sources, but since 1921 the synthetic nitrogen industry has been contributing ever increasing amounts. The nitrogenous by-products come principally from the by-product coke ovens, only 25,000 or 30,000 short tons of ammonium sulphate or the equivalent coming annually from the coal-gas plants.

Further details are given in Information Circular 6,385, "Nitrogen and its Compounds," copies of which may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D.C.

British Chemical Exports to Spain

Principal Supplier of Sulphate of Ammonia

GREAT BRITAIN has risen to second place among the countries supplying goods to Spain according to a Memorandum on the Foreign Trade of Spain during 1929 which has been prepared by the Commercial Secretary at H.M. Embassy at Madrid, and is issued by the Department of Overseas Trade.

Among chemicals, the imports of artificial organic colouring materials derived from coal show a considerable shrinkage, the figures for 1929, *viz.*, 211 tons, comparing with 414 tons in 1928. While Germany supplied the bulk of 231 tons in the latter year, she only sent 84 tons in 1929. On the other hand, shipments from France show an increase from 59 to 67 tons. Great Britain's share in 1928 was 24 tons and in 1929 only 7 tons.

In the heavy chemicals section, the position is on the whole satisfactory. The imports of impure creosote increased from 31 tons in 1928 to 1,282 in 1929. Tars progressed from 32,000 tons to 49,000 tons. Great Britain was the chief supplier of petroleum pitch and tar, and was closely followed by the United States.

In the fertiliser group, imports were on the upward grade, as will be seen from the following figures :—

	1928. Tons.	1929. Tons.
Potash salts	17,255	19,172
Commercial nitrate of soda	140,150	173,188
Synthetic nitrogen	9,361	20,380
Sulphate of ammonia	215,846	241,175

Superphosphates, however, show a sharp decline, *viz.*, 53,609 tons in 1929, compared with 134,165 and 193,925 tons in 1928 and 1927 respectively. The supplies from Chile of nitrate of soda increased by 30,000 tons, and in shipments of sulphate of ammonia, the bulk of which in 1928 was sent from Germany, Great Britain has taken the lead. Soaps and perfumery entered Spain in increased quantities, but paints and varnishes declined slightly.

Imports of artificial silk floss show that Germany, Italy, and Great Britain have been making headway at the expense of France, Holland and Switzerland.

Exports of chemical products from Spain show on the whole a decline, but shipments of perfumed soaps in 1929 exceed those of the preceding year by 111 tons. Exports of other kinds of soap declined. Perfumery, on the basis of alcohol, was sent abroad to the extent of 236 tons, which compared with 174 tons in 1928. Other perfumery exports show a falling off. Essences employed in perfumery are also down. Those used for other purposes, without alcohol, were exported to the extent of 171 tons. The 1928 figure was 22·7 tons. Exports of essential oils were not so good in 1929 as in previous years. Salt exports in 1929 were 542,399 tons compared with 596,032 in 1928 and 612,484 tons in 1927.

Institution of Chemical Engineers

Papers Read at Annual Meeting

SEVERAL papers were read at the first day's session of the ninth annual corporate meeting of the Institution of Chemical Engineers at Burlington House, London, on Thursday, with the President, Mr. J. Arthur Reavell, in the chair. A note on Baron Gian Alberto Blanc's paper on "The New Italian Leucite Industry" will appear in our next issue together with a report of the annual dinner, and a résumé of the other papers is given below.

Flax Wax Extraction

Some interesting figures on the cost of production of flax wax from flax dust were provided in a paper by W. H. Gibson, D.Sc., F.I.C., F.Inst.P. It was shown that, under suitable arrangements for the purchase of flax dust and for disposal of flax wax, a central organisation for flax wax extraction could be run at a fair return on the capital outlay. It would have, however, to be a business of small dimensions even if dealing with the whole of the Belfast area. The possibility of the central organisation not only extracting the flax wax but converting it into a polish for sale by retailers was also considered from the financial standpoint. Economy would follow from the substitution of flax wax for beeswax and it was concluded that a large polish manufactory could be run with reasonable efficiency.

Recovery of Gum

A paper "On the Recovery of Gum from Fossil Kauri Timber" was presented by R. G. Israel, Ph.D., and gave an account of the utilisation of one of New Zealand's most valuable natural resources, the gum which oozed out of the Kauri trees many thousands of years ago and has since, with the parent trees themselves, become fossilised. Partly owing to the difficulties in recovering the gum, production has gone back and the author described a patented process of recovery in which he had taken a prominent part. The principal merit of extracted pale gum was its use for nitrocellulose lacquers. Recent investigations carried out proved that this extracted gum compared favourably with ordinary kauri gum, synthetic ester gums, manila and shellac. The values obtained for the hardness of the films, their tensile strength, pressure resistance and particularly their extremely high resistance against mechanical wear, were very gratifying and proved that the gum recovered from this waste material represented a valuable contribution to the lacquer industry.

Terpene Chemicals from Waste Pine Wood

"The Extraction of Terpene Chemicals from Waste Pine Wood," by Irvine W. Humphrey, described the recovery by the steam and solvent process of terpenes from the pine stumps and other waste pine wood in the cut-over forests of Georgia, Florida and the Gulf States. In the year ending March 31, 1930, the stumps and other waste pine wood of southern United States produced 467,000 bbls., each of 500 lb. gross, of wood resin, and 4,300,000 gals. of steam-distilled turpentine, comprising approximately 18 per cent. and 12 per cent., respectively, of the total U.S. production. In addition, the pine stump had to its credit 2,834,000 gals. of pine oil, none whatever being present in the oleoresin exuded by the living pine tree, which furnishes the gum turpentine and gum rosin of commerce. There is a definite trend at the present time towards separating the various products of the process, and the author gave a detailed account of the substances obtained under the headings of non-resinous compounds, rosin, rosin esters and crystallised rosin. He concluded with some remarks on methods of rosin-refining.

Flow of Gases through Metal Pipes

"The Flow of Gases at High Pressures Through Metal Pipes" was the subject of a paper by D. M. Newitt, B.Sc., Ph.D., A.R.C.S., and S. H. Sirkar, M.Sc., A.R.S.M., read at the meeting on Friday afternoon. The authors pointed out that in processes involving the circulation of compressed gases over catalysts, it was frequently necessary to estimate the energy expended in forcing them through metal pipes of comparatively narrow bore. The assumptions contained in the resistance law of Reynolds were examined and methods of applying corrections of errors described. It was shown that the coefficients of resistance of air, nitrogen, argon and carbon dioxide up to high values of the Reynold's number have been measured and the relation between the coefficient of resistance and the velocity of flow determined in a number of cases, and the validity of the Index Law tested for high pressures. The existence of the three distinct types of flow postulated by Davies and White has been extended to the case of gases flowing in pipes of very narrow bore.

Institute of Chemistry

Work of the Past Year

AT the fifty-third annual general meeting of the Institute of Chemistry, held on Monday at the Institute, Russell Square, London, the President, Dr. G. C. Clayton, C.B.E., presented the Meldola Medal to Dr. Reginald Patrick Linstead, of the Imperial College of Science, and the Sir Edward Frankland Medal and Prize for Registered Students, to Mr. Geoffrey Broughton, of the Royal Technical College, Salford.

Submitting the Report of the Council, the President remarked on the increase in membership—which now comprises over 5,850 Fellows and Associates. The Institute encouraged those who wished to follow the profession of chemistry to take the best course possible, to become qualified, and maintained a register of competent chemists for the service of the community; but its work did not stop at registration: it rendered many services to the members and to the public. The financial position was satisfactory: the Institute was able to keep its expenditure within its income, without being unduly restricted in the pursuit of its objects. There had been an increase in the number of members without employment, which number, however, was less than 2 per cent.; but partly due to this, there had been a greater call upon the Benevolent Fund.

Legal and Parliamentary Committee

The Legal and Parliamentary Committee had been more than unusually active, having dealt with such matters as—chemical patents, service agreements for chemists, the Dyestuffs (Import Regulation) Act, the Regulations dealing with Methylated Spirits, and a proposal to present a Petition to the King in Council for a Supplemental Charter, in order to acquire for the Fellows and Associates the right to use the title "Chartered Chemist." The Council felt that it was desirable that members of the Institute should acquire this title, in order to distinguish them from pharmaceutical chemists.

The President also referred to the increasing activity of the seventeen Local Sections, in Great Britain and Ireland and in various parts of the Empire, and also to the lectures which had been published by the Institute during the year.

The Officers and Council for the ensuing year having been declared elected, the meeting considered the adoption of the Proposed Petition for a Supplemental Charter for the purpose indicated above. Although, on a division, supported by a decided majority, the matter was referred to a postal vote.

Drug and Fine Chemical Workers' Wages

Termination of National Agreement

THE existing national agreement between the Drug and Fine Chemical Manufacturers' Association and the Chemical Workers' Union will terminate under notice from the Employers' Association on June 20, 1931, the reason being that the employers desire to reduce existing wages, which are, according to grading: Men, 63s., 58s., and 53s.; women, 36s. and 30s.

The bulk of the trade is conducted in the London district, and on Sunday, March 1, a conference of union stewards and committees from 54 firms employing 12,000 workers, whose conditions are covered by agreement, was held at Anderton's Hotel, and unanimously resolved:

> "That general conditions relating to trade and profit do not justify the employers' desire for reduced wages, and, therefore, the executive council should proceed to formulate a new agreement embodying a reduction in hours, increases of wages, elimination of redundant grades, and organise general support throughout the trade on behalf of the union proposals."

Conferences similar to this are being held in the chief provincial districts, Leeds, Manchester, Edinburgh and Birmingham.

Chemical Trade of Argentina

Glue, Soap and Insecticide Imports

THE following comparative figures of the soap, glue and insecticide imports of Argentina are supplementary to the list illustrating the chemical trade of the country, published in our issue of February 21. They show the weight of imports, by countries, in the last two years :

	Kilos.	
	1928	1929
Soap, scented, medium	65,321	26,769
Spain	38,723	2,094
United States	13,679	16,175
Germany	5,021	3,180
United Kingdom	4,198	3,553
Soap, scented, ordinary	106,695	146,518
Spain	44,392	103,452
United Kingdom	24,854	15,758
France	19,190	16,632
Ochres and earths in general	3,313,449	3,550,797
France	1,133,658	921,342
Spain	452,322	655,481
Germany	580,497	631,277
Glue poignet	134,487	145,787
United Kingdom	64,545	70,398
France	50,580	64,841
Glue, common strong	965,603	1,411,824
Germany	293,555	496,517
France	241,877	212,139
Belgium	106,927	196,250
Chile	168,061	189,736
Insecticides—liquid	1,781,770	1,219,303
United States	1,759,567	1,136,695
Germany	14,368	53,122
France	2,190	14,739
United Kingdom	508	1,872
Insecticides—powder	89,056	70,898
United States	20,816	20,580
Italy	19,624	24,649
United Kingdom	6,558	6,352
Japan	1,321	8,092
Resin	21,344,594	20,325,617
United States	21,250,738	20,238,331
United Kingdom	38,940	14,514
Germany	10,885	22,630
Soap, common, etc.	617,830	467,102
United States	210,787	128,235
France	176,283	198,844
United Kingdom	113,171	15,496
Germany	56,751	77,995

German Pharmaceutical Industry

Great Increase in Production

A REMARKABLE advance has been made by the pharmaceutical branch of the German fine chemical industry, even during the current industrial depression, and its exports last year were nearly treble those of 1924 and very considerably above those of 1913. In a review of the industry *Commerce Reports* states that it is estimated that the German production of pharmaceuticals has an approximate annual retail value of 650,000,000 to 700,000,000 marks. Quarterly reports of the German Dye Trust (I.G. Farbenindustrie), the major producer of these products in Germany, and the annual statements of other leading pharmaceutical factors, consistently refer to the satisfactory production and sales of pharmaceuticals of domestic manufacture.

The German Dye Trust maintains its centre of production of medicinal chemicals and proprietary medicines at Leverkusen-on-the-Rhine, where works of the former Farbenfabriken vorm Friedrich Bayer are situated. The Dye Trust is reckoned to produce about 40 per cent. of the total German output of pharmaceuticals, or about 4,000 metric tons annually. After the Dye Trust, the next six important manufacturers, included among the following, may be reckoned as producing an average wholesale value of 8,000,000 marks each annually : Schering-Kahlbaum A.G., Berlin ; E. Merck, Darmstadt ; Riedel-de Haen Co., Berlin-Britz ; C. F. Boehringer and Soehne, G. m. b. H., Mannheim-Waldhof ; Chemische Fabrik von Heyden A.G., Dresden-Radebeul ; Chemische Werke Grenzach A.G., Grenzach ; Knoll and Co., Ludwigshafen-on-the-Rhine ; Gehe and Co. A.G., Dresden ; C. H. Boehringer Sohn, Niederingelheim-on-the-Rhine ; Ver. Chininfabriken and Co., Frankfort-on-the-Main ; and Saccharin Fabrik vorm. Fahlberg List and Co., Magdeburg.

Consuming Countries

Of Germany's total exports of medicinals in 1929, European countries consumed about 50 per cent. The leading purchasers in this group were Austria, the Netherlands, Czechoslovakia, Switzerland, and Great Britain, in the order named. The Orient was the destination of approximately 15 per cent., and the countries leading in consumption were China, Japan, British India, and Turkey, respectively. South America purchased about 12 per cent. of Germany's medicinal exports, Argentina, Brazil, and Chile having been leading consumers.

Considerable gains were effected in the exportation of proprietary medicines and pharmaceuticals from Germany to each of the countries mentioned, during the period 1926 to 1929, inclusive. The approximate increases in exports were as follows : Austria, 80 per cent. ; the Netherlands, 80 per cent. ; Czechoslovakia, 100 per cent. ; Switzerland, 100 per cent. ; Great Britain, 300 per cent. ; British India, 120 per cent. ; China, 120 per cent. ; Japan, 130 per cent. ; Argentina, 150 per cent. ; Brazil, 120 per cent. ; Chile, 90 per cent. ; and Mexico, 115 per cent.

Final Figures of the Fair

Growth in Overseas Interest

THE total attendances at the British Industries Fair at Olympia and White City, London, and Castle Bromwich, Birmingham, are announced as follows :

	Overseas Buyers.	Home Buyers.	Public.
London	4,854	167,259	34,679
Birmingham	1,984	106,682	14,215
Totals	6,838	273,941	48,894

The attendances of home buyers showed an increase of about 30,000 over last year's figures, and the actual number of overseas buyers, not counting repeat visits, was up by over 25 per cent.

An analysis of the overseas buyers' cards for the London sections of the Fair showed that 75 countries were represented as compared with 70 last year. Out of 26 European countries, 21 sent more buyers than last year, three out of the remaining five sending the same number as before. Denmark sent three times as many buyers as last year, and Czechoslovakia twice as many. Other good increases were for Germany, Italy, Switzerland, Finland and Spain. Russia's representation was 22 as compared with one solitary buyer last year.

Advance on Previous Fairs

In a statement on the Fair, Mr. William Graham, M.P., President of the Board of Trade, said : " Important buyers and controllers of buying in this country who have not hitherto volunteered opinions on the Fair, have said that this one was a great advance on any previous Fair in this country. They found in it a greater number of their suppliers than hitherto ; they found it more convenient in arrangement and better in display than the great continental fairs, and it is evident from exhibitors' statements that these buyers backed up their words by placing orders and making inquiries which will result in substantial business in the months to come. The manufacturers at home, the Empire producers and the world's buyers, have adopted the Fair as part of their commercial organisation and as such it should continue to prosper in good times and bad. It will not be surprising if other industries follow the lead of cotton and artificial silk and hold exhibitions within, or at the same time as, the Fair in order to share in the benefits to be obtained by joint effort of this kind."

The strong recommendation of the Association of British Chemical Manufacturers, that principals of the firms should be available on the chemical stands, was widely followed, principals taking so many hours' duty regularly each day, with very successful results in many cases.

From Week to Week

FUEL GASIFIED and the amount of gas distributed by the South Staffordshire Mond Gas Co. last year both increased by 8 per cent. and the cost of fuel increased by 10½ per cent.

MR. W. J. REES, lecturer on Refractories at Sheffield University, will read a paper on the "Manufacture of Lime," at the next meeting of the Chemical Engineering Group of the Society of Chemical Industry at Burlington House, London, on Friday next.

ABOUT £5,000 has been spent at the Fuel Research Station during the last 18 months on plant for pulverised fuel experiments, and some £650 on time of staff and for materials. During the next financial year it is estimated that expenditure on staff and materials will amount to £1,500.

AT THE STATUTORY MEETING of Goodlass Wall and Lead Industries, Ltd., the chairman (Mr. Clive Cookson) said it was the intention of the company to open a factory in the Argentine Republic, and he had no doubt that by this means they would be able, not only to preserve that market, but actually to enlarge it.

COAL used at gas works and by-product coke ovens was approximately 34,500,000 tons in 1928 and 37,500,000 tons in 1929, stated Mr. Shinwell, in the House of Commons on Tuesday. In addition, several hundred thousand tons were used in the production of pig-iron by processes which include the recovery of by-products. The figures for 1930 were not yet available.

THE BRITISH ALUMINIUM CO., LTD., have issued another of their admirably produced booklets, this time under the title of "Aluminium, Its Production, Properties and Application." The history, methods of manufacture, and applications are admirably summarised in twenty-three pages, and each is faced with a full-page photograph of aluminium works, products and aluminium plant in course of manufacture.

I.C.I. PROGRESS OVERSEAS has taken a further step by the formation of Imperial Chemical Industries (Malaya), Ltd., with offices at 144, Robinson Road, Singapore, and intended to operate throughout the Malay Peninsula and Siam. Mr. O. H. Eustace, late of I.C.I. (China), Ltd., is the managing director, and Mr. R. D. Shrimpton, late of I.C.I. (India), Ltd., secretary and accountant. Imperial Chemical Industries, (Levant), Ltd., have recently opened offices at Limasol and Famagusta.

DR. CHARLES L. REESE, director and consulting chemical engineer of E. I. du Pont de Nemours and Co., Wilmington, U.S.A., has been elected chairman of the reorganised board of directors of the American Chemical Society. Changes in the constitution authorising an increase in the number of directors from ten to fourteen have been adopted by the Society, which has 18,000 members and an annual budget of approximately $600,000. The four new directors are chosen at large on the basis of business ability and experience, it being recognised that a close community of interest exists between science and business. Dr. Reese is also a member of the new executive committee.

A MEMORIAL SERVICE for Sir Charles Algernon Parsons, the famous engineer, was held at Westminster Abbey on Tuesday, when the following were among the many societies and public bodies represented: Royal Society—Lord Rayleigh, Sir Frank Smith, Sir Frederick Hopkins (president), Sir Henry Lyons (treasurer), Sir Alfred Ewing, and Professor W. W. Watts. Royal Institution—Mr. G. W. C. Kaye and Sir William Bragg. British Association—Professor T. O. Bower. Iron and Steel Institution—Sir Robert Hadfield. Institute of Metals—Dr. Richard Seligman; Institute of Physics—Dr. W. Eccles. British Electrical and Allied Manufacturers' Association—Mr. I. V. Robinson and Mr. D. N. Dunlop. National Physical Laboratory—Sir Richard Glazebrook and Dr. Rosenhain. Chemical Society—Professor J. F. Thorpe. British Optical Instrument Manufacturers' Association.—Mr. Watson Baker and Mr. J. H. Sutcliffe. British Scientific Instrument Research Society—Sir Herbert Jackson. British Engineers' Association—Mr. D. A. Bremner. Leeds University—Professor Smithells. Imperial College of Science—Professor A. Fowler, Mr. H. T. Tizard, Professor H. B. Baker, and Professor S. Chapman. Government Laboratory—Sir Robert Robertson. Professor H. E. Armstrong was also present.

DR. B. WYLAM, of Scottish Dyes, Ltd., Grangemouth, has been appointed by the Government to be Chief Inspector of Alkalis for Scotland. There was a large number of applicants for the post.

THE MINISTER OF HEALTH has appointed Dr. A. C. Monkhouse, B.Sc., A.I.C., Ph.D., to be an Inspector under the Alkali, etc., Works Regulation Act, 1906. He has been assigned to the district with headquarters in Bristol.

THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE is transferring its soil and drainage research to the Macaulay Institute for Soil Research, and the scientific apparatus purchased by the college with assistance from public funds is now being handed over to the Institute.

A PERMIT has just been granted in the United States to E. I. du Pont de Nemours to ship in tank cars a new refrigerant known as "dichlorodifluoromethane," by including it in a list of liquefied compressed gases which, under present specifications, may now be shipped in this manner.

AT THE MEETING of the Joint Executive Committee of the Dyers' Union with representatives of the Allied Association of Bleachers, Dyers, Printers and Finishers, in Manchester on Monday, the employers' proposal for a ten per cent. reduction in wages was rejected. It is understood that a full meeting of the Association is being held to consider the question on Monday next.

RECENT WILLS include: Lord Birkenhead, a director of Imperial Chemical Industries, Ltd., and other companies (net personalty £10,459), £63,223. Mr. Joseph Coggin Pattinson, of Leeds, senior director of Richardson and Pattinson, Ltd., dyers (net personalty £13,633), £14,389. Mr. James Arthur Kershaw, of Headingley, Leeds, oil merchant (net personalty £21,011), £23,286.

THE RELIANCE PATENT FUEL WORKS, Llanelly, has been purchased by the Alvah Towers Co., Ltd., Dashwood House, Old Broad Street, London. The new owners, writes our South Wales correspondent, propose to form a new company to be known as the Alvah Towers (Reliance Fuels), Ltd., with a capital of £50,000. The works, which have been closed down for some time, are to be re-opened this month.

THE INDUSTRIAL FILM, "The Jewels of Industry," made by the Carborundum Co., Ltd., Trafford Park, Manchester, was entirely revised last autumn, and since January 7 this year has been shown to large audiences of engineers and others in a number of provincial towns. The film deals in a very interesting manner with the creation of Carborundum and Aloxite and the manufacture of these abrasives into grinding wheels.

DAMAGE estimated at £200 was caused by a fire at the works of the Northern Dyers, Ltd., Darlington, on Tuesday, when a quantity of benzine became ignited. Fortunately the fire brigade soon had the flames under control, and no damage was done to fabrics which had been sent to the works for treatment. Another blaze on the same day occurred at W. and F. Walkers' soap and oil refinery works, Field Lane, Litherland, where disinfectant from a large still overflowed and became ignited. For a time, two tanks, each containing 1,000 gallons of petroleum, seemed likely to be involved, but this danger was averted and the flames were subdued in twenty minutes.

UNIVERSITY NEWS: *Cambridge*—Mr. P. M. S. Blackett, M.A., King's College, has been appointed University Lecturer in Physics for three years from January 1, 1931. Mr. P. J. Durrant, M.A., Ph.D., has been appointed University Demonstrator in Chemistry for three years from February 7, 1931; and Mr. F. P. Bowden, Ph.D., University Demonstrator in Chemistry for three years from October 1, 1930. *Liverpool*—The Council on recommendation of the Senate, has conferred the title of Professor Emeritus upon Dr. Walter Ramsden, who resigned from the Johnston Chair of Biochemistry last December.

Obituary

MR. FREDERICK REVERDIN, a pioneer in dye research and a well-known writer on chemical matters, at Geneva on February 28, aged 82.

MR. S. WRIGHT LEE, a director of J. H. and S. Johnson, Ltd., manufacturing chemists, Liverpool, with whom he had been associated for 73 years, aged 91.

MR. JAMES HUGH PAUL, B.Sc., F.I.C., chairman of Sofnol, Ltd., Charlton, London, a well-known authority on water-softening and boiler chemistry, at Blackheath, aged 76.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

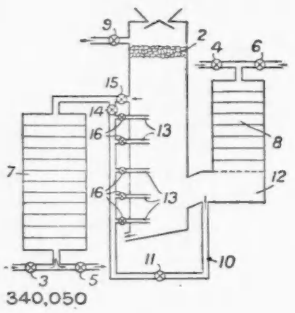
340,011–2. Fatty Acid Derivatives. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 11, 1929.

340,011. The polyhalogenated fatty acids obtained as in specification 336,623 (see The Chemical Age, vol. XXIII, p. 578) are treated with aqueous or alcoholic caustic alkalis, or ammonia, sodium carbonate, phosphate or acetate, ammonium formate or urea. This removes the halogen atoms wholly or partly, with the formation of double bonds, or replaces them by hydroxy groups. With caustic alkalis, the products are soluble in alkali and yield salts which are cleansing and emulsifying agents, and with weak alkalis, the products are insoluble in alkalis, and may be polymerized by boiling with caustic soda, yielding products which are elastic and resemble caoutchouc. Examples are given of the treatment of tetrachlorpalmitic acid, pentachloro-ricinoleic acid, hexa-chloro-ricinoleic acid, hexachlor-stearic acid, tetrachlor-oleic acid, heptachlor-palmitic acid, a chlorinated mixture of linoleic and linolenic acids, the ethylanilide of tetrachlor-oleic acid, and the methylanilide of hexachloro-ricinoleic acid. The preparation of the above acids is also described.

340,012. The polyhalogenated fatty acids containing more than 8 carbon atoms in the molecule or their esters or amides or conversion products still containing halogen, see specifications 339,675 (The Chemical Age, Vol. XXIV, p. 148) and 340,011 above, obtained by treating polyhalogenated higher fatty acids with alkalis, etc., are treated with sulphides or polysulphides so that the halogens are partly replaced by mercapto and hydroxy groups and partly split off with the formation of double bonds. Examples are given of the treatment of several of the acids referred to in 340,011 above. The products are sulphonated soaps.

340,050. Hydrogen. D. Tyrer, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, October 3, 1929.

Air is passed through a regenerator 7 and valves 14, 16, to a coke bed 2, where it burns carbon deposited on the previous run, and some coke. The gases pass to a combustion chamber 12, and are burnt by preheated air from pipe 10.



340,050

The valves 11, 3, 6, 14 are then closed and valves 4, 5, 9, 15 opened. Hydrocarbon gas, with or without steam, is passed through regenerator 8 into the hot coke 2, where it is decomposed. The hot gases pass out at 15 to the regenerator 7 and at 9 to heat the fresh coke. The products contain hydrogen.

340,082. Red Lead. H. Erzinger and Chemische Fabrik Schonenwerd H. Erzinger Akt.-Ges., Schonenwerd, Switzerland. Application date, October 30, 1929.

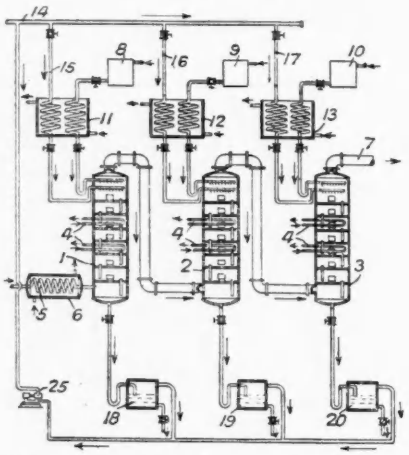
A mixture of litharge in an excess of water is treated with small quantities of an organic acid capable of forming basic lead salts soluble in water, *e.g.*, acetic, formic and amino-acids obtained by heating cheap refuse proteins, and then with carbon dioxide till a strongly basic lead carbonate is formed. This carbonate is oxidised by burning at 100° C., yielding a red lead of low density.

340,083. Vulcanization Accelerators. Dunlop Rubber Co., Ltd., 32, Osnaburgh Street, London, D. F. Twiss and F. A. Jones, Fort Dunlop, Erdington, Birmingham. Application date, November 1, 1929.

Dithiocarbamates are treated with reactive halogen derivatives of benzene or its homologues, including halogenated benzenes or alkyl, aryl or acyl derivatives in which the presence of additional negative radicals, *e.g.*, nitro groups, renders at least one of the halogen atoms reactive towards the alkyl substituted dithiocarbamates. Aliphatic, aromatic or heterocyclic derivatives of dithiocarbamates may be employed, either in the free state or as salts. A number of examples are given.

340,098. Ethereal Sulphates and Alcohols. Standard Oil Development Co., Linden, N.J., U.S.A. Assignees of H. E. Buc, 620, Loeust Street, Roselle, N.J., U.S.A. International Convention date, November 15, 1928.

Mixtures of olefines are absorbed in sulphuric acid, first below 65 per cent. strength, then of 78-82 per cent. strength, and finally above 90 per cent. strength, the temperature being below 120° F. for the first and second stages. A mineral oil may be added to assist in the absorption. Olefines higher than propylene are absorbed in the first and second stages, and



340,098

propylene in the third stage. Olefine gas passes through heat exchanger 6 to a series of towers 1, 2, 3 having temperature regulators 4, and sulphuric acid of the required strength is supplied from tanks 8, 9, 10 through heat exchangers 11, 12, 13. Mineral oil may be supplied from pipe 14 through the same heat exchangers. The products pass to tanks 18, 19, 20, where the oil is separated and recirculated by a pump 25. Isobutylene and its higher homologues, and some secondary olefines above hexylene, are absorbed in tower 1, secondary butylene, amylene, and hexylene in tower 2, and propylene in tower 3.

340,101–2. Synthetic Resins. British Celanese, Ltd., 22, Hanover Square, London. International Convention date, November 17, 1928.

340,101. Benzaldehyde is condensed with an aromatic sulphonamide, *e.g.*, benzene-sulphonamide or a toluene- or xylene-sulphonamide, with or without a catalyst. Other synthetic resin components such as formaldehyde, furfural, acetone, urea, phenol or aniline may also be present. The products are employed as ingredients in compositions having a basis of cellulose ester or ether, and may be used for making lacquers, varnishes, filaments, films, adhesives, and laminated glass. A number of examples are given.

340,102. This process is similar to 340,101 above, except that furfural is used in place of benzaldehyde.

340,120. FERTILIZERS. Armour Fertilizer Works, 111, West Jackson Boulevard, Chicago. International Convention date, December 11, 1928.

A fertilizer such as a mixture of superphosphate, potassium chloride or sulphate, ammonium sulphate and sodium nitrate, with or without organic material, is treated with liquid anhydrous ammonia in amount sufficient to neutralize the free acid.

Specifications Accepted with Date of Application

343,002. Forging or extruding of liquid or plastic iron, steel, and other metals or alloys. F. Multhaupt. December 21, 1928.

343,003. Acid-proof alloys. Skoda Works, Plzen. October 31, 1928.

343,006 and 343,016. Azo-dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. November 2, 1928, and October 8, 1928.

343,007. Ferro-titanium alloys, Production of. W. Mathesius and H. Mathesius. November 5, 1929.

343,013. Mercaptobenzothiazoles, Manufacture of. Goodyear Tire and Rubber Co. November 26, 1928.

343,014. Dyestuffs containing metal, Manufacture of. Soc. of Chemical Industry in Basle. October 5, 1928.

343,047. Complete roasting of highly sulphidic ores, Apparatus for. Metallges. Akt.-Ges., and H. Klencke. October 7, 1929.

343,054. Mixtures comprising hydrogen and nitrogen, Production of. H. Ritter. November 9, 1928.

343,071. Sulpho-derivatives of higher fatty acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. G. Kalischer, and K. Keller. November 7, 1929. Addition to 342,761.

343,072. Benzimidazolone stibinic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 7, 1928.

343,090. 1 : 4 : 4^1-trihydroxy-2 : 2^1-dianthraquinonyl-3 : 1^1-oxide, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.* November 13, 1929.

343,091. 1 : 4 : 1^1 : 4^1-tetrahydroxy-2 : 2^1-dianthraquinonyl, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). November 13, 1929.

343,098. Wetting, cleansing, and dispersing agents, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). August 7, 1929.

343,099. Thermo-plastic products from fatty oils, Manufacture of. Imperial Chemical Industries, Ltd., and H. M. Bunbury. August 8, 1929.

343,100. Derivatives of pyranthrone, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 9, 1929.

343,116. Oily polymerisation products from butadiene or a homologue thereof. I.G. Farbenindustrie Akt.-Ges. October 16, 1928.

343,125. Phosphatic manures, Manufacture of. B. Bodrero. November 13, 1928.

343,147. Soluble ethers from vegetable materials, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) November 14, 1929.

343,160. Mixed gas containing carbon monoxide and hydrogen, Production of. Gutehoffnungshutte Oberhausen Akt.-Ges. November 15, 1928.

343,164. Azo dyestuffs insoluble in water, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 16, 1928.

343,165. Silicyl compounds, Preparation of. H. P. Kaufmann. November 16, 1928.

343,172. Decomposition under the action of heat of a mixture of methane or other hydrocarbons and water vapour. Union Chimique Belge Soc. Anon. June 22, 1929.

343,178. Thiocyanogen salts, Production of. E. Hene. November 19, 1928.

343,285. Carrier bodies for catalytic agents, Manufacture of. Verein für Chemische und Metallurgische Produktion. January 22, 1929.

343,286. Cracking petroleum oils. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. February 14, 1929.

343,287. Potassium nitrate, Manufacture of. Nitro-Sel and J. Margoles. January 23, 1930.

343,320. Zinc-aluminium alloy. H. C. Hall. February 24, 1930.

343,359. Benzol obtained by pyrolysis, Treatment of. D. A. Howes, W. S. G. P. Norris, S. T Henderson, and Imperial Chemical Industries, Ltd. March 26, 1930.

343,390. Phosphorous compounds, Manufacture of. Victor Chemical Works. April 29, 1929.

343,397. Easily soluble salts of benzyl morphine, Manufacture of. Chemical Fabrik vorm. Sandoz. May 24, 1929.

343,419. Azo dyestuffs, Manufacture of. W. W. Groves. (*I. G. Farbenindustrie Akt.-Ges.*) April 10, 1930. Addition to 336,938 and 339,620.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Bloxham, A. G., and Soc. of Chemical Industry in Basle. Improving animal or vegetable materials. 6,186. February 27.

Blythe and Co., Ltd., W., and Catlow, B. Resolution of mixtures of phenolic substances into their components. 5,725. February 24.

Buchner, M. Process of producing salts of hydrofluosilicic acid. 5,565. February 23. (Germany, February 24, 1930.)

Caro, N., and Frank, A. R. Catalytic oxidation of ammonia. 6,035. February 26. (Germany, March 3, 1930.)

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of softening-agents for textile goods. 6,202. February 27.

Carter, P. G., Imperial Chemical Industries, Ltd., Thomas J., and Thomson, R. F. Production of vat dyestuffs, etc. 6,250. February 27.

Distillers Co., Ltd. Aeration or dispersion of gases, etc., in liquids. 5,749. February 24.

——, Joshua, W. P., and Stanley, H. M. Conversion of olefines into alcohols. 5,896, 5,897. February 25.

Du Pont de Nemours and Co., E. I. Sulphur dyes. 5,943. February 25. (United States, February 25, 1930.)

—— Striping cloth or paper. 5,944. February 25. (United States, February 25, 1930.)

—— Reduction of indigo. 6,249. February 27. (United States, February 27, 1930.)

Electro Metallurgical Co. Nitriding. 6,006. February 26. (United States, February 26, 1930.)

—— Nitriding ferrous metal. 6,007, 6,008. February 26. (United States, February 26, 1930.)

E. M. S. Industrial Processes, Ltd. Evaporation of liquids, etc. 6,076. February 26.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of liquid products from tars, petroleums, etc. 5,628. February 23.

—— Manufacture of conversion products of rubber. 5,629. February 23.

—— Separation of gas mixtures. 5,906. February 25.

I.G. Farbenindustrie Akt.-Ges. Manufacture of indigoid vat dyestuffs. 5,622. February 23. (Germany, February 22, 1930.)

—— Manufacture of ester-like wetting-agents, etc. 5,913. February 25. (Germany, February 25, 1930.)

—— Manufacture of vat-dyestuffs. 6,059. February 26. (Germany, February 26, 1930.)

—— Production of photographic colour pictures. 6,345. February 28. (Germany, February 28, 1930.)

—— Manufacture of aminoanthraquinone nitriles. 6,366. February 28. (Germany, March 1, 1930.)

Kárpáti, J. Converting tars into pitch, benzine, etc. 6,084. February 26.

Naugatuck Chemical Co. Treatment of rubber. 5,652. February 23. (United States, March 8, 1930.)

—— Rubber articles. 5,671. February 23. (United States, March 8, 1930.)

Pallemaerts, F. A. F., and Union Chemique Belge Soc.-Anon. Manufacture of nitric acid. 6,169. February 27.

Parrish, P. Manufacture of ammonium compounds. 5,929. February 25.

Ruhrchemie Akt.-Ges. Conversion of aliphatic hydrocarbons into higher hydrocarbons. 5,973. February 25. (Germany, February 26, 1930.)

—— Production of organic substances. 5,974. February 25. (Germany, February 26, 1930.)

—— Conversion of unsaturated aliphatic hydrocarbons into higher hydrocarbons. 6,116. February 26. (Germany, March 1, 1930.)

Horace Cory and Co., Ltd.

AT the annual meeting of Horace Cory and Co., Ltd., held in London on Monday, the Chairman (Mr. G. P. Watson) announced that arrangements were now being made for the sale in Great Britain and foreign countries of the special printing ink used in connection with Price's Dry Litho Process. The chemical and physical properties of this ink enabled a great advance to be made in lithographic work. Their company was also interested in the Menell Estonian Oil Syndicate, Ltd., which held a concession for the Estonian Government over 40 square miles of rich shale deposits and had patented a really efficient retort for obtaining petrol.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8½d. per lb. d/d U.K.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.
CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall.; pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.
POTASSIUM CHLORATE —3¼d per lb., ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.
SALAMMONIAC.—Firsts lump, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77%.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS (CAKE AND POWDER)—3¼d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3⅜d. per lb. d/d U.K.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£14 10s. per ton, f.o.r. London, casks free.
SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in returnable casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6½d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.
ACID CRESYLIC 99/100.—1s. 9d. to 1s. 10d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 2s. 2d. to 2s. 3d. per gall. Pale, 98%, 1s. 8d. to 1s. 9d. Dark, 1s. 4d. to 1s. 4½d.
ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.
BENZOLE.—Prices at works: Crude, 5½d. to 6½d. per gall.; Standard Motor, 1s. to 1s. 1d. per gall.; Pure, 1s. 5½d. to 1s. 6½d. per gall.
TOLUOLE.—90%, 1s. 8d. to 1s. 9d. per gall. Pure, 1s. 10d. to 1s. 11d. per gall.
XYLOL.—1s. 8d. to 1s. 9d. per gall. Pure, about 1s. 11d. per gall.
CREOSOTE.—Standard specification, for Export, 5½d. per gall. f.o.b.; for Home, 4d. per gall. d/d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent, 90/190, 1s. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £11 11s. per ton.
PITCH.—Medium soft, 45s. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. 6d. to 3s. 9d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. per lb. 100%.
ACID GAMMA.—Spot, 3s. 6d. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra d/d buyer's works.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE.—£74 per ton d/d.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.
DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.
B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—9d. per lb.
R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.
SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12 to £12 10s. per ton. Liquor, 9d. per gall.
ACETONE.—£60 to £62 10s. per ton.
CHARCOAL.—£6 to £9 per ton, according to grade and locality.
IRON LIQUOR.—10d. to 1s. 4d. per gall.
RED LIQUOR.—9d. per gall.
WOOD CREOSOTE.—1s. 9d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—2s. 11d. per gall. Solvent, 3s. 9d. to 4s. per gall.
WOOD TAR.—£4 to £5 per ton.
BROWN SUGAR OF LEAD.—£37 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality
ARSENIC SULPHIDE, YELLOW.—1s. 7d. to 1s. 9d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality.
CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.
CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
CARBON BLACK.—3¼d. to 4 1/16d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4⅝d. to 5⅛d. per lb.; Dark, 4⅛d. to 4⅞d. per lb.
LAMP BLACK.—£28 per ton, barrels free.
LITHOPONE, 30%.—£19 to £21 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

VERMILION, PALE OR DEEP.—6s. 6d.–7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. per lb. for 1-cwt. lots.
ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—1s. 9d. to 1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 0¾d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 0¼d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—8s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—8s. per lb
BISMUTH CITRATE.—7s. 6d. per lb.
BISMUTH SALICYLATE.—7s. 3d. per lb.
BISMUTH SUBNITRATE.—6s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. per lb.
BISMUTH OXIDE.—9s. 10d. per lb.
BISMUTH SUBCHLORIDE.—9s. 7d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts., 10d. per lb.; 36 W. Qts., 9½d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 6d. per lb., according to quantity.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
EMETINE HYDROCHLORIDE.—58s. 6d. per oz.
EMETINE BISMUTH IODIDE.—33s. per oz.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s. 9d. to 10s. 6d. per oz.
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—27s. 6d. per oz.
HYDRASTINE HYDROCHLORIDE.—90s. per oz. for small quantities.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; to 128-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 11d. per lb., for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 9d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt. according to quantity.
IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
PARAFORMALDEHYDE.—1s. 8d. per lb.
PARALDEHYDE.—1s. 1d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.
PILOCARPINE NITRATE.—10s. 6d. per oz.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—83s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
QUINOPHAN.—B.P.C., 14s. 6d. to 16s. 6d. per lb. for cwt. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—18s. 6d. per lb.
SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 5d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 6d. per lb. B.P.C. 1923, and U.S.P., 1s. 10d. per lb. for 28-lb.. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—85s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 6s. to 7s. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—9s. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 9d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 4d. per lb.
CINNAMIC ALDEHYDE NATURAL.—11s. 9d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—6s. 6d. per lb.
CITRAL.—6s. 6d. per lb.
ETHYL CINNAMATE.—6s. 9d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL.—6s. to 10s. per lb.
HELIOTROPINE.—5s. 9d. per lb.
METHYL ANTHRANILATE.—6s. 3d. per lb.
METHYL BENZOATE.—4s. 3d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.
RHODINOL.—38s. 6d. per lb.
SAFROL—1s. 6d. per lb.

Prices of Essential Oils

ANISE OIL.—3s. 3d. per lb.
BERGAMOT OIL.—8s. 6d. per lb.
BOURBON GERANIUM OIL.—14s. per lb.
CAMPHOR OIL.—White, 2s. per lb.; Brown, 1s. 6d. per lb.
CANANGA.—Java, 8s. 3d. per lb.
CASSIA OIL, 80/85%.—4s. 3d. per lb.
CINNAMON OIL LEAF.—5s. per oz.
CITRONELLA OIL.—Java, 2s. 3d. per lb., c.i.f. Pure Ceylon, 2s. 3d. per lb.
CLOVE OIL, 90/92%.—7s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%—1s. 9d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 8s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

March 5, 1931.

THERE has been a fairly satisfactory volume of business placed during the last week, although the demand is mainly confined to buyers near requirements. Prices with very few exceptions continue steady. Export business shows a slight improvement.

General Chemicals

ACETONE.—The market is now steady at about £60 to £65 per ton, according to quantity, with the volume of business about up to average for the past few months.

ACID ACETIC.—A fairly regular demand is being received and the price is unchanged at £36 5s. to £38 5s. for technical 80% and £37 5s. to £39 5s. per ton for pure 80%.

ACID CITRIC.—Only a very small interest is shown in this product and the price remains in buyers' favour at about 1s. 1¼d. to 1s. 1¾d. per lb., less 5%.

ACID FORMIC.—There is a steady demand with the market firm at about £38 per ton for 85% technical material.

ACID LACTIC.—Requirements continue along quietly steady lines and prices have recently been reduced. These now stand at about £39 to £40 per ton for the 50% by weight pale quality.

ACID OXALIC.—The market is receiving a satisfactory volume of business with prices unchanged at £30 7s. 6d. to £32 per ton, according to quantity.

ACID TARTARIC.—The demand is rather slow and price unchanged at about 1s. 0½d. per lb., less 5%.

ALUMINA SULPHATE.—The demand for this product is mainly on contract account and the market is unchanged at £7 15s. to £8 5s. *per ton for 17/18% iron free quality.*

ARSENIC.—Not quite so active during the past week although early delivery is still rather difficult. The market remains firm at £19 to £19 10s. per ton.

BARIUM CHLORIDE.—There is rather more inquiry for this material with price a little steadier at about £9 10s. to £10 per ton.

CREAM OF TARTAR.—Demand is mainly for small quantities and the market is about steady at 86s. per cwt., ex warehouse.

COPPER SULPHATE.—The price is unchanged at about £22 to £22 10s. per ton, less 5% free on rails, London, with a fairly satisfactory demand.

FORMALDEHYDE.—There is a fairly good demand at £30 to £30 10s. per ton.

LEAD ACETATE.—A small business is being concluded at about £34 5s. per ton for white, with brown quoted at £1 per ton less.

LEAD NITRATE.—In quiet request at about £29 10s. per ton.

LITHOPONE.—There is a steady demand with the market unchanged at £18 to £22 per ton, according to grade and quantity.

POTASSIUM BICHROMATE.—Unchanged at makers' price of 4¼d. per lb., with usual discounts for quantities.

POTASSIUM CHLORATE.—Fairly active and the market continues firm at £28 to £30 per ton.

PERMANGANATE OF POTASH.—In rather better demand with the market firm at £63 10s. to £65 10s. per ton, according to quantity.

SODIUM BICHROMATE.—Conditions are unchanged, the market being firm at makers' price of 3½d. per lb., with usual discounts for contracts.

SODA CHLORATE.—There is a satisfactory demand and the market is firm at £26 10s. per ton.

SODIUM HYPOSULPHITE.—Photographic crystals are in better request and price unchanged at £14 5s. per ton. Commercial quality is only in small demand at about £8 10s. per ton.

SODA YELLOW PRUSSIATE.—There is no change in this market, quoted prices being 4¾d. to 5¼d. per lb., according to quantity.

TARTAR EMETIC.—There is a small inquiry and the market is about 11d. per lb.

ZINC SULPHATE.—In fairly steady request at £11 to £11 10s. per ton.

Coal Tar Products

WE do not know whether the recent reduction in the price of petrol will have any effect on benzol, solvent naphtha and heavy naphtha. Up to the time of sending in this report, no definite change has been felt, but we expect the prices of the above-mentioned products to come down in sympathy. The market still remains quiet and prices unaltered.

MOTOR BENZOL.—Quoted at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Unchanged at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Quoted at about 3d. to 3¼d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Worth about 1s. 8d. per gallon for the 98/100% quality, and about 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Remain at £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Quoted at 37s. 6d. to 42s. 6d. per ton, f.o.b., East Coast port.

Nitrogen Fertilisers

Sulphate of Ammonia.—Export.—The demand continues to be moderate and the price remains steady at about £7 per ton, f.o.b., U.K. port in single bags, for neutral quality, 20·6% nitrogen.—*Home.*—Bad weather has delayed the usual seasonal demand, especially in the north, and merchants' purchases are on a smaller scale than at this time last year. The price remains unchanged.

Nitrate of Soda.—It is understood that deliveries to consumers during the month of February were on a smaller scale than last year, but the decline might have been expected to be greater in view of the depressed state of agriculture. Prices remain unchanged.

Latest Oil Prices

LONDON, March 4.—LINSEED OIL was inactive and occasionally 2s. 6d. per ton lower. Spot, ex mill, £20 5s.; March and April, £18 10s.; May-August, £19; September-December, £19 5s., naked. RAPE OIL was steady. Crude, extracted, £29 10s.; technical, refined, £31, naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £20; refined common edible, £24; deodorised, £26, naked, ex mill. TURPENTINE was steady. American, spot, 37s. 9d.; April, 38s.; May-June, 38s. 6d.; Russian, spot, 35s. per cwt.

HULL.—LINSEED OIL, naked, spot to August, closed at £19; September-December, £19 5s. per ton; Baltic, spot, unquoted. COTTON OIL, Egyptian, crude, spot, £19 10s.; edible, refined, spot, £22 10s.; technical, spot, £22 5s.; deodorised, £24 10s. CASTOR OIL, spot, 41s. 6d.; firsts, 36s. 6d.; seconds, 34s. 6d. (per cwt.). PALM KERNEL OIL, crude, naked, 5½ per cent., spot, £24. GROUNDNUT OIL, crushed-extracted, spot, £24; deodorised, £28. SOYA OIL, crushed-extracted, spot, £19 10s.; deodorised, £23. RAPE OIL, crushed-extracted, spot, £29 10s.; refined, £31 10s. per ton. COD OIL, 19s. per cwt. TURPENTINE, 39s. 9d. per cwt.

South Wales By-Products

PITCH continues to have a slow and sporadic market, the big users, especially the patent fuel makers, confining their purchases to immediate requirements. Quotations are unchanged. There is a better call for road tar, with values unchanged round about 13s. per 40-gallon barrel. Refined tars have a fair and steady call, with quotations for coke-oven and gasworks tar unchanged. There is only a small demand for solvent naphtha, while there is scarcely any call for heavy. Patent fuel and coke exports continue to be unsatisfactory. Patent fuel prices, for export, are as follows: 21s. to 21s. 6d., ex-ship Cardiff; 20s., ex-ship Newport and Swansea. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 16s. 6d. to 17s. 6d.

Scottish Coal Tar Products

QUOTATIONS continue somewhat irregular according to the position of each manufacturer. Creosote oil has been in steady, if small demand, but other products are quiet. Water white products will all be affected by the further reduction in price of petrol.

Cresylic Acid.—Few inquiries are on the market and prices are easy. Pale, 99/100%, 1s. 6d. to 1s. 7d. per gallon; pale, 97/99%, 1s. 5d. to 1s. 6d. per gallon; dark, 97/99%, 1s. 4d. to 1s. 5d. per gallon; high boiling, 1s. 7d. to 1s. 9d. per gallon; all ex makers' works.

Carbolic Sixties.—No business is being concluded and value is nominal at about 1s. 6d. per gallon for grades containing under 5% water.

Creosote Oil.—There is a scarcity of straight run oils in this area. Specification oils, 2½d. to 3d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon; washed oil, 3d. to 3¼d. per gallon; all f.o.r. works in bulk.

Coal Tar Pitch.—Value remains nominal at 40s. to 42s. 6d. per ton f.a.s. Glasgow for export, and about 42s. 6d. per ton f.o.r. works for home trade.

Blast Furnace Pitch.—Controlled prices remain at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Export inquiries are more numerous. Makers' quotations range from 2½d. to 3d. per gallon f.o.r. naked, according to quantity and delivery.

Blast Furnace Tar.—Without interest at 2¾d. per gallon.

Crude Naphtha.—Available supplies obtain 4¼d. to 4½d. per gallon f.o.r.

Water White Products.—Business is dull and prices are easy. Motor benzol is 1s. 3½d. to 1s. 4d. per gallon; 90/160 solvent, 1s. 2½d. to 1s. 3½d. per gallon; 90/190 heavy solvent, 1s. 0½d. to 1s. 1d. per gallon; all f.o.r. makers' works in bulk.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, March 3, 1931.

INQUIRIES for home trade have been steady in the Scottish heavy chemical market.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3½d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11¾d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. 0d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £28 per ton, ex wharf. On offer for shipment from China at about £27 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £22 10s. per ton, ex wharf. Spot material still on offer at £22 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £8 10s. per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £34 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 7s. 6d. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¼d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £10 per ton, carriage paid, buyer's sidings, minimum six-ton lots.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—*Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton;* ground American, £9 per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £19 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

A New Moulding Powder

Produced in I.C.I. Laboratories

IMPERIAL CHEMICAL INDUSTRIES announce a new moulding powder, the product of two common disinfectants, carbolic acid and formaldehyde. In the I.C.I. research laboratories at Blackley, it was found possible to produce a powder from these two chemicals, which could be moulded into any shape and dyed in any colour, however bright. Although both carbolic acid and formaldehyde are in themselves unstable, in the final form the new substance has great resistance to heat, and is a non-conductor of electricity. Already it has been used in the manufacture of such different articles as umbrella handles, lamp holders, switches and electric fittings of all descriptions, whether low tension or high tension, wireless appliances, and telephone equipment. It can replace vulcanite in most of its uses, or take the place of ebony for the backs of brushes. It can be used instead of celluloid, and screw threads can be moulded into it.

The original product is a synthetic resin, phenol-formaldehyde. The powder is poured into moulds of any shape, which are closed by hydraulic steam-heated presses. The mass solidifies, and in a few moments the finished article, bright and polished, is ready for use. The colour is brought out in the pressing. This material affords a good instance of the way in which old materials are being gradually replaced.

Soap Manufacture in India

THE annual report on the Administration of Mysore during the year ended June 30 last states that the output in the Government soap factory was 180 tons against 170 in the year previous, the total sales being of the value of Rs. 2·87 lakhs as against Rs. 2·29 lakhs in 1928-29. After providing for interest and depreciation the factory earned a profit of Rs. 50,802-13-9. Experiments were carried on in the manufacture of Turkey-red-oil, germicidal soap, etc., and in view of the satisfactory results obtained, the erection of a small plant for the manufacture of Turkey-red-oil on a semi-commercial scale has been approved.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, March 5, 1931.

In one or two quarters during the past week traders on the chemical market here have reported a very slight increase in the number of transactions put through, although in few instances have the weights involved been of much importance. This, however, seems not to have been the general experience, and conditions are still rather patchy on the whole. Expectations of better things to come in chemicals have been raised by the reports of slightly improving conditions in the cotton industry which has been reflected in a decline in the incidence of unemployment in Lancashire. In the meantime, prices of most varieties of chemical products keep up at steady levels.

Heavy Chemicals

No more than a quiet business has been reported during the past week in respect of sulphide of sodium, current values of which are at about £9 10s. per ton for the 60-65 per cent. concentrated solid quality and £8 for the commercial product. Saltcake is in moderate demand, with offers this week at from £2 15s. to £3 per ton. A quietly steady inquiry is reported in the case of prussiate of soda, quotations for which are fully maintained at from 4¾d. to 5¼d. per lb., according to quantity. Alkali is firm and in fair request at round £6 per ton. A quiet trade is passing in phosphate of soda, offers of which are maintained at £10 per ton for the dibasic quality. There has been little change in the price position of chlorate of soda, values being at about £26 10s. per ton, with the demand this week on moderate lines. Bichromate of soda meets with a fair amount of inquiry and values keep up at 3½d. per lb., less 1 to 2½ per cent. Hyposulphite of soda is attracting only limited buying interest, with the photographic quality selling at from £15 to £15 10s. per ton and the commercial at about £9. There is a fair inquiry about in the case of bicarbonate of soda and values are firm at £10 10s. per ton, in contracts. Caustic soda continues to be quoted here at from £12 15s. to £14 per ton, according to quality and in contract lots, and moderate delivery specifications are reported.

Carbonate of potash is a steady section and a moderate business has been done at about £25 10s. per ton. Offers of yellow prussiate of potash are on a very firm basis, with values at from 6¾d. to 7¼ per lb., according to quantity, a quiet demand being reported this week. Not a great deal of business is offering in chlorate of potash at the moment, but prices are steady at about £27 10s. per ton. Permanganate of potash is selling in rather small quantities, but prices are held at about 5¼d. per lb. for the commercial grade and 5½d. for the B.P. There is a quiet demand about for caustic potash, values of which are in the neighbourhood of £29 per ton. Bichromate of potash is in moderate request on the basis of 4¼d. per lb., less 1 to 2½ per cent., according to quantity.

Sulphate of copper prices are not too firm, current offers ranging from about £20 10s. to £21 per ton, f.o.b., with buying interest limited to moderate parcels. There has been little change in the price position of arsenic, current quotations being at £19 per ton, at the mines, for white powdered, Cornish makes, a shilling or two below this figure being indicated in one or two instances. The acetates of lime are in quiet demand and easy in tendency at about £7 5s. per ton for the brown quality and £13 for the grey. A slow demand is reported in the case of the lead products, with nitrate at about £29 10s. per ton, brown acetate at from £33 10s. to £34 15s., and white acetate at £33 17s. 6d. to £35 15s., according to quantity.

Acids and Tar Products

The demand for tartaric acid this week has been on quiet lines at about 11½d. per lb., with citric in no better situation at from 1s. 1½d. to 1s. 2d. per lb. Oxalic acid is in moderate request, with offers still at about £1 12s. per cwt., ex store. With regard to acetic acid, prices in this section are firm and a quietly steady business is being done; glacial technical is at £51 per ton and upwards, according to quantity, and the commercial 80 per cent. product at £37.

Activity in the by-products is very moderate on the whole, with pitch at 38s. to 40s. per ton, f.o.b., and creosote oil at from 3d. to 4d. per gallon, naked, at works, according to quality. Carbolic acid is in good demand at the moment, with 60's crude material firm at round 1s. 2d. per gallon, naked, at works, and crystals at from 5d. to 5¼d. per lb., f.o.b.

Company News

International Nickel Co. of Canada, Ltd.—The annual meeting is announced for March 31, to be held in Toronto.

Alexander Duckham and Co.—The profit and loss account for the year 1930 shows a gross profit of £87,903, and a net profit of £11,201. The board recommend a final dividend of 7 per cent., making 10 per cent. for the year.

International Paint and Compositions Co., Ltd.—The directors announce that profits for 1930 were £110,904, as compared with £104,813 for 1929. A final dividend of 9 per cent. is recommended on the ordinary shares, making 12 per cent. for the year, against 10 per cent. in 1929.

Joseph Nathan and Co.—The report for the year ended September 30 last shows a net profit of £68,066. After payment of one year's dividend on the 7 per cent. "A" preference shares and placing £9,440 to reserve account the balance to the credit of appropriation account is £58,887. The ordinary shares receive a 10 per cent. dividend, the first since 1922, when 8 per cent. was distributed, and £32,702 is carried forward.

South Staffordshire Mond Gas Co.—In their report for the year ended December 31 last, the directors state that the gross profit was £18,826, and after deducting prior lien and debenture stock interest there was a net profit of £5,910. With £15,818 brought forward from the previous year there is a credit balance of £21,728. The directors state that they deem it expedient to conserve the financial resources of the company, and do not recommend the payment of any dividends.

Sir Ernest Benn on "Economy"

Speaking in company with Sir John Simon at the Free Trade Hall, Manchester, on Tuesday, at a great demonstration organised by the Friends of Economy, Sir Ernest Benn said that the Economy Campaign was sweeping the country. Since the first meeting, little more than a month ago, in London, every political party had displayed anxiety to be associated with the new Economy Movement. The Conservative Party had tabled a motion of censure based upon economy; the Liberal Council had issued a manifesto; and Mr. Snowden had made his historic speech.

Nine thousand local authorities were all beginning to think in terms of Economy. The London County Council had reduced the county rate by 7d., Surrey by 6d., and Essex by 1s. These were the first welcome results.

It was important that they should understand exactly what Economy meant. The engineering or any other scientific industry gave a clue to the truth. Economy meant not less but more; it meant an increase in wealth and prosperity. The great science of engineering, developed within comparatively recent years, was built entirely upon the theory of economy—economy of time, economy of material, economy of power. The more the economy the greater the wealth for everybody.

Sir Ernest defined Economy in the single word "Value." It did not mean that you must spend less. It did not mean parsimony, cheeseparing, hoarding. It meant value for value. The more you spend for good value the greater your economy. As a rule the individual who spent his own money would secure good value for it, but to be in control of the public purse was to be in a position where value found it hard to penetrate. Thus it had come about that the Economy Campaign was chiefly directed to the reduction of public expenditure. The worst thing that could happen to money was that it should get into the public purse.

Agents in Palestine

A confidential memorandum on the appointment of agents in Palestine prepared by the representative of the Overseas Department of Trade at Haifa has been received and issued by the Department to firms whose names are on its Special Register. British firms who desire to obtain a copy of the memorandum and particulars of the Special Register service should apply to the Department (Reference No. C.X. 3466 should be quoted).

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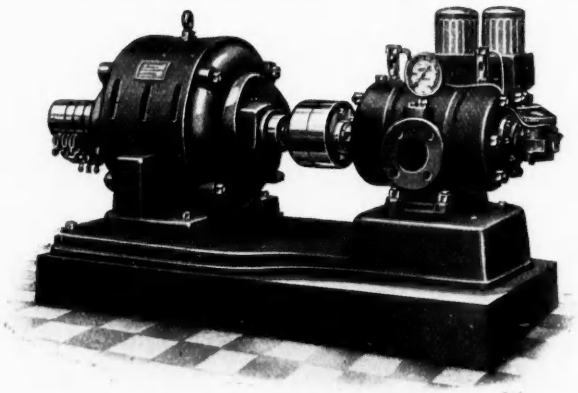

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BOLT (A. J.) JUNR. (PORTSMOUTH), LTD., 97, St. Thomas Street, Portsmouth, chemical manufacturers. (C.C., 7/3/31.) £103 2s. 4d. January 29.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

HENEWARD CHINA CLAY CO., LTD., London, S.E. (M., 7/3/31.) Registered February 21, £2,100 debentures part of £5,000 and 10 per cent. premium; general charge. *£1,800 debentures. April 30, 1930.

MANCHESTER CELLULOSE FINISHES, LTD. (M., 7/3/31.) Registered February 21, mortgage and debenture, to National Bank, Ltd., securing all moneys due or to become due to the bank; charged on land and buildings at Stretford (subject to prior mortgage), also general charge. *£2,400. December 31, 1929.

SUPERFINE CHEMICALS, LTD., London, S.W. (M., 7/3/31.) Registered February 19, £4,000 debentures (secured by Trust Deed dated February 12, 1931); general charge. *Nil. February 16, 1931.

London Gazette, &c.

Company Winding Up

RUBBER PROCESSES, LTD., Roberttown, Liversedge, York. Last day for receiving proofs for intended dividend to preferential creditors, March 18, 1931. Liquidator, G. D. Pepys, 33, Carey Street, Lincoln's Inn, London, W.C.2.

Company Winding Up Voluntarily

MUSKER PULVERIZED COAL SYNDICATE, LTD. (C.W.U.V., 7/3/31.) Creditors' claims to C. E. Harper, of 3-4, Clements Inn, London, W.C.2, liquidator of the company, by March 14.

Bankruptcy Information

FLETCHER, R. J., 76, Gleneagle Road, Streatham, Surrey, electro-chemical engineer. (R.O., 7/3/31.) Receiving order, February 26, 1931. Creditor's petition.

Notice of Dividend

BISHOP, John Duval, trading as A. C. AND J. D. BISHOP, 22-23, Great Tower Street, London, E.C., scientific glass and bottle merchant, lately residing at "Conzut," Weybridge, Surrey. First and final dividend, 1s. 4¼d. per £, payable, March 6, at the offices of F. S. Salaman, 1-2, Bucklersbury, London, E.C.4.

New Companies Registered

CAMPBELL GALLOWAY AND WARREN, LTD., 140, West George Street, Glasgow. Registered in Edinburgh on February 25. Nominal capital £1,000 in 700 preference and 300 ordinary shares of £1 each. Merchants, brokers and agents for the sale of paints, colours, enamels, varnishes, chemicals, etc. Directors: J. G. Galloway, C. D. Warren, A. C. Campbell, C. Campbell, R. H. Douglas.

SCOTTISH PHENOL CO., LTD., 3, Elmbank Street, Glasgow. Registered February 21 in Edinburgh. Nominal capital £100 in £1 shares. Refiners, distillers, lime dealers, brickmakers, coal merchants and dealers, pharmaceutical, manufacturing, analytical, consulting and general chemists or druggists, etc. Directors: R. A. L. Gracie, A. Crawford.

STANLEY G. WALKER AND CO., LTD., Registered February 25. Nominal capital £4,000 in £1 shares. To acquire from S. G. Walker the business carried on by him as Stanley G. Walker and Co., at 79, Gracechurch Street, London, E.C., and to carry on the business of manufacturers of and dealers in chemicals, drugs, paints, varnishes, colours, dyestuffs, pharmaceutical preparations, etc. Directors: S. G. Walker, Foxley Hall, Purley; H. V. Edwards.

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to March 18, 1931.

AGROSAN.

519,613. Class 2. Chemical substances used for agricultural, horticultural, veterinary, and sanitary purposes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. January 20, 1931.

Tariff Changes

AUSTRALIA.—Caustic potash has been added to the list of materials regarded as raw materials for the purpose of applying the British Preferential Tariff.

BRITISH HONDURAS.—An Order-in-Council exempts from import duty for a period of three years as from December 1, 1930, the following articles imported for use in the manufacture of soaps:—carbonate of soda, salammoniac and washing soda, powdered sulphur, eucalyptus oil, oil of cloves, concentrated lye, lime, colourings, carbolic acid, ammonia, turpentine, bismuth and boric acid.

ITALY.—A provisional concession, valid till January 31, 1932, allows the import into Italy of trichloride of phosphorus for the manufacture of chemical products.

PERU.—A recent law fixes the export duty on vanadium ores, mechanical concentrates and metallurgical products, irrespective of their vanadium content or market price, at 45·29 soles per metric ton in place of the former variable duties.

YUGOSLAVIA.—The sale is prohibited of artificial sweeting substances—defined as chemical products the sweeting power of which is greater than the same quantity of sugar (saccharose)—and foodstuffs prepared therewith. Exception is made in the case of medicines, dietetic substances prepared by chemists, etc.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

BRITISH INDIA.—The Director-General, India Store Department, Belvedere Road, Lambeth, London, is calling for tenders by March 17 for the supply of 200 cwt. of commercial acetone (sample required with tender).

SOUTH AMERICA.—A British subject with some 20 years' business experience in Chile, is at present in the United Kingdom with the object of obtaining the representation of British manufacturers of industrial chemicals, in Chile, Colombia, Venezuela, the Guianas, and other South American countries, or Spain. (Ref. No. 173.)